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Filling Around Cellar Walls.

A correspondent (N. V. Welton, of Waterbury, Conn.,) in a note at the end of a letter to us, says, "this cold winter brings to mind a matter connected with the building of houses which I do not remember ever to have seen in print, and which, if generally known, is seldom practiced. It is this, in any cold climate cellar walls of houses should never be filled in around with loam or clay, or earth that retains much moisture, because the frost expands it, and it exerts a great pressure against the walls, tending to thrust them out of position. The effects of this are seen in many cracked walls, the breaking of window and door sills and lintels; unjointed verandahs; and windows and doors rendered incapable of opening and closing, &c. In our New England States, this costs us many thousands of dollars yearly, all of which may be saved by filling in a few inches of sand or clean gravel next the walls."

We hope those who build houses this summer will not forget to follow the above advice. It is sound, and given in good season for practicing upon during the whole in-coming season for building.

New Gold Varnish.

A very beautiful and permanent gold varnish may be prepared in the following manner:—2 ozs., of the best garancine are digested in a glass vessel with a 6 ozs. of alcohol, of spec. grav. 0·833, for twelve hours, pressed and filtered. A solution of clear orange-colored shellac in similar alcohol, is also prepared, filtered, and evaporated until the lac has the consistence of a clear syrup; it is then colored with the tincture of garancine. Objects coated with this have a color which only differs from that of gold by a slight brown tinge. The color may be more closely assimilated to that of gold by the addition of a little tincture of saffron.

Another Alleged Cure for Hydrophobia.

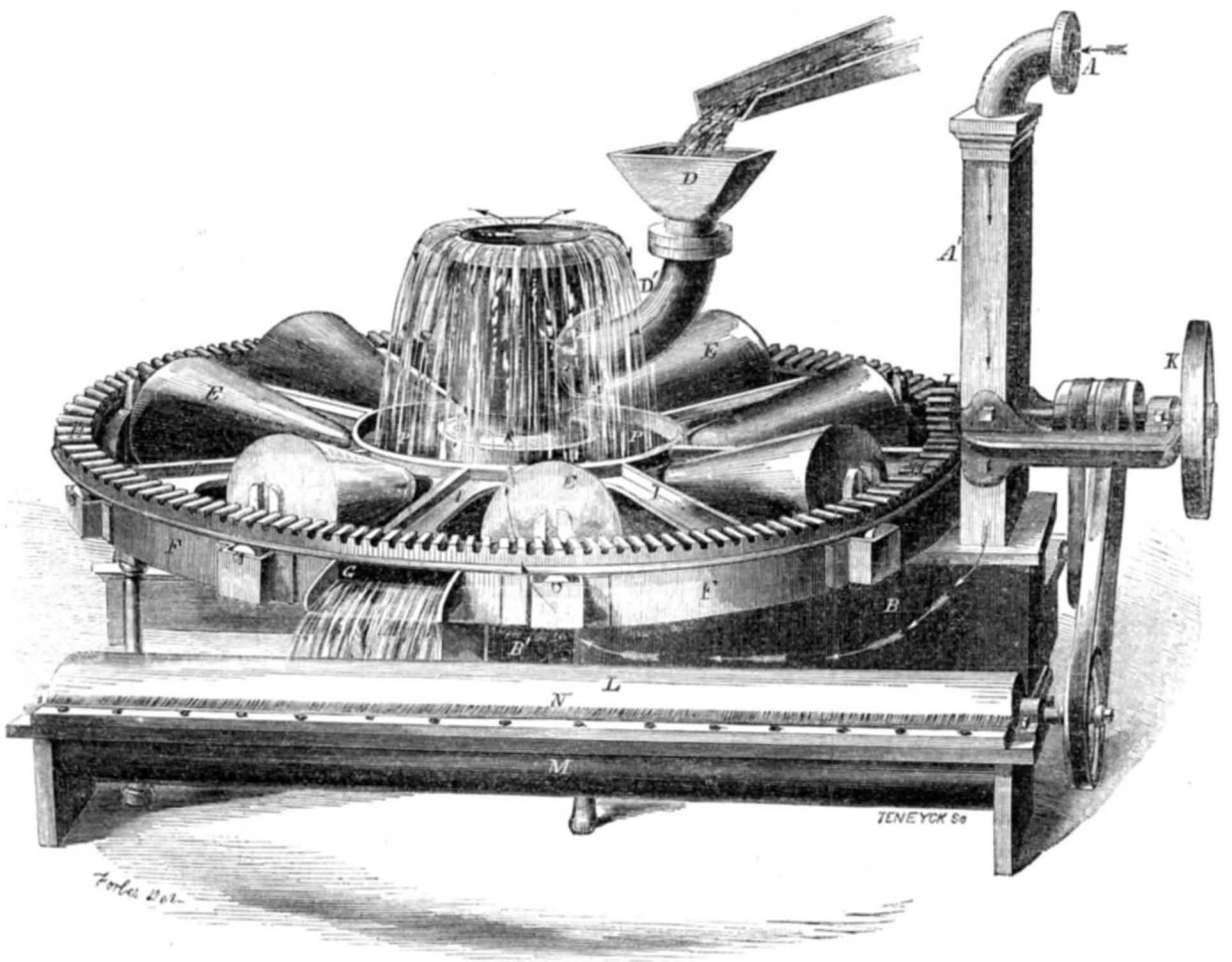
M. Guerin Meneville lately brought before the French Academy of Sciences a means of curing hydrophobia, which, he stated, is practiced in Russia with success. A little insect, the golden cetonides, found in considerable quantities on rose trees, is proved, when pounded to a powder, and administered internally, to produce a profound sleep, which sometimes lasts for thirty-six hours, and which has the effect, in many cases, of completely nullifying the hydrophobic affection. A distinguished entomologist af Russia, M. Motschouski, has tried several experiments with this insect, and in most cases with success.

The Trade in Pearl Shells.

During the year 1855 there have been four vessels loaded with pearl shells at the islands in the Bay of Panama, amounting to 650 tuns

By the latest accounts from Australia very rich deposits of tin had been discovered, and large shipments of the ore had been made to England. It is supposed by some persons that these tin discoveries will yet prove more valuable than those of Australian gold.

MACHINE FOR WASHING AND SEPARATING GOLD.



Addison's Improved Gold Separator.

Our engraving illustrates an invention for separating gold from sand, crushed quartz, &c. The separation is effected in part by water, and in part by quicksilver, the two processes being ingeniously combined. Since the great discoveries of gold in California and other parts of the world, many contrivances have been invented for the extraction of the precious ore. A leading endeavor has been to dispense with the use of quicksilver, the procurement, application, and cost of that metal having always formed a serious difficulty. But all such efforts have been fruitless; those who had abandoned the mercurial process, found, after abundant experiment, that they were cheating themselves.

The affinity between quicksilver and gold is so great that no sooner do their particles come in contact than they unite, and hold fast to each other in a loving embrace, which fire alone can fully separate. The larger particles of gold may be easily separated from the quartz by means of water, but quicksilver is the only substance known that will effectually arrest the fine dust. In quartz crushing and sand washing a large per centage of the gold is always present in the form of an impalpable powder, to collect which mercury is indispensable.

The apparatus here presented operates in the following manner:—A stream of pure water is introduced at the supply pipe, A, and flows down through the post, A', into the tank, B, passing onward towards the end of the tank, B', in the direction indicated by the arrows. The tank is divided by a partition at the end, and in the compartment thus formed there is a small water wheel with spiral buckets—not here shown. The partition is furnished with suitable valves, for regulating the flow of water into the wheel. The water wheel is put in motion by the pressure of the in-coming water; the wheel serves to agitate the water and give it a circling upward motion. The receiver, C, is placed immediately above the water wheel, and the water, after passing through the wheel, rises, bubbling and gurgling, into the receiver. Here it meets the sand or quartz dust, which is fed into the receiver, C, mixed with water, from the trough box, D, and pipe, D'; continuing its upward course, the water rises over the top of the receiver, and falls down, as from a fountain, into the basin, P. The heavier pieces of gold fall down through the receiver and wheel to the bottom of the tank, B', into some quicksilver there deposited. The finer particles of gold and dirt are carried with the water, and fall over the edge of the receiver into the basin just mentioned. From this basin the mixture spreads and flows evenly over a circular platform or bed plate, F, upon which the conical rollers, E, travel. Quicksilver is spread out on the platform and the rollers serve to mix the gold and dirt with the mercury. The latter will, of course, absorb and retain the gold, leaving the dirt and water to flow away through spout G. The rollers are carried in a circular ring or wheel, of which the rack, H, forms the upper edge, and I the spokes. The rack, and with it the rollers, are put in motion by means of the pinion, J, power being applied at K. Less than half a horse power is required to operate the machine.

L is a long wooden roller, covered with cloth, and revolving in a trough, M, the bottom of which contains quicksilver. The water and dirt from the spout, G, fall into the trough, and if any minute particles of gold are present they are absorbed by the mercury. N is a long brush, for preventing the quicksilver from being carried over on the roller, L. The roller, L, serves to agitate and mix the substances in the trough with the mercury. The muddy water finally escapes from a spout at one end of trough M.

The large machine from which our engraving was taken is six feet in diameter. Price, $2000. It was built by Messrs. Dunkin and Vansiclen for the Wykoff Gold Mining Co., whose mines are located in Farquhar Co., Va., near Fredericksburgh.

It strikes us that machines like the above may be very easily worked, and that they must be very effective and thorough in their operations. We do not remember to have seen any invention for the purpose that appeared to be more perfect, either theoretically or practically The arrangement is such that ores containing sulphurets may pass through the machine without the least danger of clogging up. The sulphurets being generally heavier, sink below the surface of the water; the peculiar construction of the machine facilitates their escape.

This improvement is the invention of Mr. John S. Addison, deceased, and was patented Jan. 16, 1855. The owner of the patent is Mr. P. W. Engs, No. 6 Old Slip, of whom further information may be obtained.

Steam Thawing Machine.

J.B. Latta, of Cincinnati, O., has invented a portable steam generating apparatus for thawing out frozen water pipes, which appears to be a really useful invention, and might be used with beneficial effects in various parts of our city, at present. The apparatus is used by the fire department of Cincinnati, to thaw the plugs, hydrants, cisterns, pumps, or any such water arrangement that may be frozen. It is mounted on a sleigh, and looks like a stove, with a pipe rising from it, from which the smoke issues. The steam is conveyed through hose into the fire plugs, etc., and produces the desired thaw. The boiler consumes about three gallons of water in four hours.

Sharks were frozen to death in Tampa Bay, Florida, during the severe cold in January last. So it is said.

The rings of the planet Saturn will be visible all this year, with the aid of a telescope.

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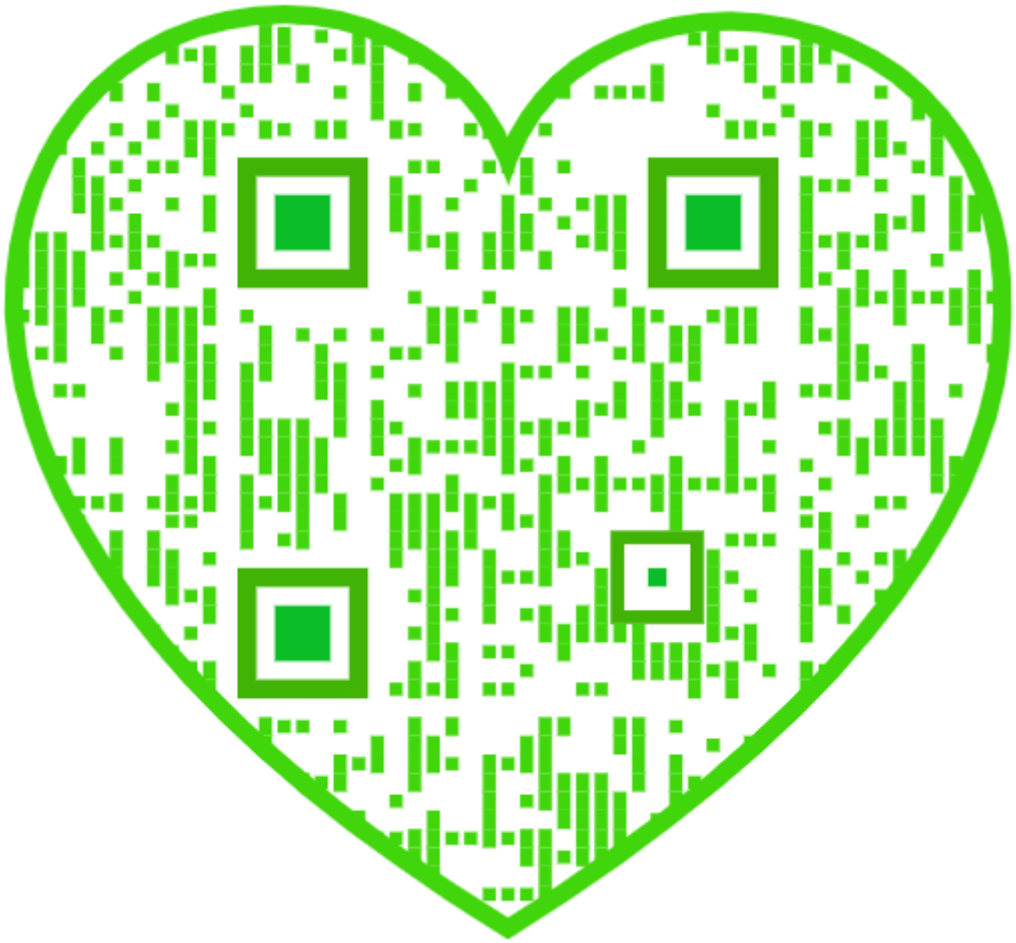

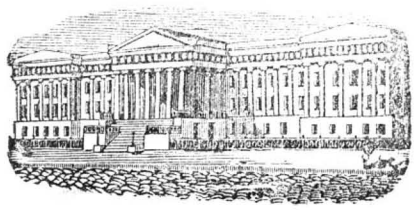

[Reported Officially for the Scientific American.]

LIST OF PATENT CLAIMS

Issued from the United States Patent Office

FOR THE WEEK ENDING MARCH 4, 1856.

APPARATUS FOR COOKING WITH QUICKLIME—W. W. Albro, of Binghamton, N. Y.: I claim the apparatus or device formed of the vessels A C D, constructed or arranged substantially as shown and described, for the purpose specified.

SWEEPING STREETS—Timothy Alden, of Troy, N. Y.: I claim, first, the arrangement and use of the sliding boxes, k, springs, c, and levers, l, in combination with the broom handles and crank shaft, substantially as set forth, for the purpose of making the brooms self-adjustable under all circumstances, to overcome the inequalities of the pavements to be swept.

Second, I also claim the use of the guard board, q, arranged longitudinally of the machine, for the purpose of collecting the dirt in wind rows, in combination with the brooms, for sweeping the dirt against the said guard-board, substantially as set forth.

Third, I also claim the use of the collecting and elevating wheel, s, in combination with the guard-board, q, and revolving bush, r, arranged and used substantially as set forth and for the purposes described.

Fourth, I also claim the use and arrangement of the shield-board, u, for the purpose of holding the dirt within the buckets of the collecting and elevating wheel till ready to be discharged therefrom, hopper boards, Y, and endless carrying band, w, in combination with the collecting wheel, the said combination of parts arranged and operating substantially as before set forth.

SAWING MARBLE IN TAPER FORM.—Christopher Amazeen, of New Castle, N. H.: I claim the jointed guide bars, F F, arranged as shown, so that two pairs of saw frames may be driven from one shaft, and one pair of saw frames be set, if desired, at different angles or degrees of obliquity from the other pair, for the purpose specified.

MANUFACTURING HATS—James W. Beebe, of Brooklyn, N. Y.: I claim making hats with a stiffened body, combined with a felt covering, reduced to the required form by felting, and put over and attached thereto with hatters' varnish, or other equivalent adhesive substance, substantially as set forth and for the purpose specified.

CORN HARVESTERS—William M. Bonwill, of Camden, Del.: I do not claim the circular saws for cutting the stalks, for they have been previously used, but arranged differently from the way shown.

But I claim the two saws, J J, placed at the front part and at each side of the platform, A, in combination with the horizontal plates or beds, K K, and discharge rods, c c, arranged substantially as shown and deteribed, for the purpose specified.

SKEIN FOR AXLE ARMS—John M. Burke, of Danville, N. Y.: I claim constructing the skein, C, of a metal plate which is bent in conical or taper form, with a space or opening, a, in its upper part, the skein being secured to the arm, B, by means of the bolts, E E, substantially as shown and described.

PLOWS—James J. Cadenhead, of Macon [Co., Ala.: I claim the adjustability of the brace, K, in combination with that of the bar, O, and that of the beam, C, for the purpose of regulating, as described, the pitch of the beam and the hight of the beam and handles together or separately.

SHINGLE MACHINE—Ransom Clifford, of Lowell, Mass: I claim, first, the combination of the driving bar, attached to and moved by endless chains, and the lever or levers, N N, for the purpose of communicating motion to the shaving knives, substantially as described.

Second, the construction of the driving bar with the upright arms, L L, carried by the endless chains and chain gears, and its combination with the cross bar, M, and knives, K K, in such a manner as that the driving bar shall be turned on its axis, and be made to run clear of the knives just before it reaches them, substantially as described.

HEATING BUILDINGS—Robert Cornelius, of Philadelphia, Pa.: I claim the arrangement of one section of the steam tubing within another section, whereby the steam tube itself is made to serve as a regulator and controller of the heat of the building.

HINGE FOR SHUTTERS—Isaac Davis, of Groton, N. Y.: I claim the use of the conical screw, K, operating in combination with the wheel, G, held in position by, and turning on the pin, E, the whole being constructed so as to operate in the manner described.

HARVESTER RAKES—Owen Dorsey, of Howard Co., Md.: I claim the combination with the rake arms, c c, to which the rakes are firmly attached, of the vertical revolving shaft, i, and cam way or guide, f f m m; from which the rake arm receives an undulating motion in a vertical plane revolving about said shaft, i, substantially in the manner and for the purpose set forth.

SELF-ACTING FARM GATES—Elon Dunbar, of Philadelphia, Pa.: I claim, first, the combination of the vibrating beams, A, and railway, B', with the lower bent and weighted lever, G, upon which the flaps rest, and vibrating levers and rods for connecting them together, and the gate suspended on the railway, the several parts named being arranged and operating as set forth.

Second, I claim constructing the gate in two parts, in the manner described, and suspending the lower part, K2, by the weighted, N, so as to enable the flap, I, to draw said lower part downward during the raising of the upper main part, to prevent a space for the passage of small animals being formed between the flaps and bottom of the gate, as described.

Third, I also claim the combination of the series of parts consisting of levers, rods, shafts, and radial arms, for operating the spring bolt, o, with the suspended gate, as set forth.

LUBRICATOR—William Elias Everett, of New York City: I claim, first, a stationary oil cup or reservoir, in combination with a flexible tube, one of whose ends communicates with the cup, and the other with the surfaces to be lubricated, substantially in the manner and for the purposes specified.

Second, I claim giving motion to the spoons of a mechanical oil cup, when it is used in combination with a flexible tube by means of a vibrating lever or its equivalent, which derives its motion from the tube itself, substantially as set forth.

BOOT CRIMPS—George Tetter, of Philadelphia, Pa.: I do not desire to claim the method described of changing the relative position of the foot and leg by the regulating screw, D, and its appendages, as other mechanical devices for accomplishing the same end might be substituted.

But I claim, first, the crimping of the upper leathers of boots by confining and submitting them to the action of the leg, A, and foot, B, the said leg and foot being jointed together at the instep, and operated in the manner set forth, or any equivalent to the same.

Second, the radial adjustable guide, C, with its traversing pincers, in combination with the leg, A, and foot, B, the whole being arranged and constructed substantially in the manner and for the purpose set forth.

SHEEP SHEARS.—Luther B. Fisher, of Coldwater, Mich.: I am aware that a sheep-shearing machine has been devised, in which a combination of racks, pinions, pawls, spur wheels, crank pulleys, &c., are used for vibrating the cutters. This machine is too complicated to be useful, and requires both hands to operate it. I do not therefore, lay any claim to such a machine.

But I claim the so constructing of the shears, so that the mere clasping of the hand or operating of the fingers in which the shears are held and controlled, shall produce a multiplied motion of the cutters, and this I claim, whether said multiplied motion be produced through the jointed levers described, or their equivalents.

PORTABLE HOUSES—Daniel Fitzgerald, of New York City: I claim, first, constructing a house by inserting the weather-boarding ends into a channel, E, at the corner posts, A B, substantially as described.

Second, the drawing together of the parts of the posts, A B, to secure the weather-boarding, it being held up against A, by nails or screws.

Third, the inserting the ends or tenons of the girders, G, into the channel, E, in such a manner that the weight of the chamber floor, roof, &c., may bear on the weather-boarding, and press the joints together as it may shrink, or allow it to rise when it swells.

Fourth, the setting the girder in the same slot with the weather-boarding,

Fifth, I claim setting the floor plank ends in a channel in the girders, or between the two halves of the girders, so that no nails are required, and so that the upper part of the girder will be the base of the room.

Sixth, the channeling the sides of the door and window frames, so that the weather-boarding can be inserted or taken out without the use of fastenings.

SUPPLEMENTARY GRATING—B. F. Foering, of Philadelphia, Pa.: I claim cleaning or removing foreign substances, slate, cinders, clinkers, etc., from stoves, furnaces, or other heating devices in which anthracite coal is burned, by means of the supplementary grating, D, applied to the stove or furnace or inserted within it, substantially as shown and described.

RIFFLE BOXES—F. R. Ford, of Ophir, Cal.: I claim the arrangement of the riffles, E and C, in respect to the surface of the quicksilver, as described.

POWER LOOMS—James Greenhalgh, Sen., of Waterford, Mass.: First, in combination with the method of balancing the boxes, I claim the method of giving motion to the shaft, f, to operate the boxes, by means of two notched bars, j j', which are geared with opposite sides of the pinion, e, on the said shaft, and are suspended from the levers, t t', which are operated upon by a pattern cylinder in such a manner as to raise either of the said bars as may be necessary to bring its teeth into engagement with a dog, i or i', suitably arranged and operated to give the requisite motion to the bar.

Second, I claim the method of giving the shuttle boxes a single or double movement, as may be required by the pattern, by employing two hooks, i i', or their equivalents, by having unequal movements, arranging the said hooks or their equivalents with their points at different elevations, and employing long and short studs in the pattern cylinder or its equivalent, to raise the rack bars, j j', which give motion to the boxes, to a position to be caught only by the hook having the shorter movement, or to a position to be caught by the hook having the longer movement, substantially as described.

Third, controlling the order of the succession of the movements of the two pickers, to make them act in regular alternate succession or otherwise, as may be desirable, by means of a pattern cylinder or its equivalent, acting upon the mechanism by which the movement is transmitted from the driving shaft to the pickers, in such a manner as to throw or retain either picker in gear with the said shaft and the other one out of gear, substantially as described.

Fourth, the combination of the levers, J J', through which the cams on the driving shaft operate the pickers, with the sliding shaft, K, the lever, q, and the V-shaped stud, 7, the said lever, q, being moved from side to side by the pattern cylinder, and the said V-shaped stud receiving a suitable motion to operate on the said lever, q, substantially as described.

GUARD FOR COAL HOLES—George C. Jenks, of Boston, Mass.: I am aware that the cover of a coal vault opening has had a solid ring guard and standard, so made and applied together and to it as not only to be capable of of being raised out of the coal vault with the cover during the act of elevating the latter, but of being set up above and around the hole or opening so as to serve as a guard to prevent a person from accidentally slipping and falling into the same.

But rest my claim on my improvement, viz., a coal vault mouth guard, made expansive and provided with means whereby it shall or may be expanded while being elevated to a horizontal position above the opening of the vault, the said guard by such means when raised to a horizontal position to extend beyond the sides of the opening, so as to lessen the danger of accident to pedestrians, as specified.

HEATING BUILDINGS—C. H. Johnson, of Boston, Mass: I am aware that a single air and gas burner has been provided with a perforated diaphragm arranged below that on which the gas is burned, and in the gas receiving chamber, the same being for the purpose of commingling the currents of air and gas before they might reach the perforated diaphragm on which they are enflamed, therefore I do not claim such.

But I claim the described combination and arrangement of an air divider (a closed box, H, having a perforation, c, extending across it, and receiving the air from a pipe, as described,) with one or more gas receiving chambers, D D D, and the air and gas mixers, b b b, of the burner diaphragm, a a a, for the purpose or purposes specified.

WEIGHING SCALES—James Kelly, of Sag Harbor, N. Y.: I am aware that scales have been provided with a sliding tare weight on one end of the beam, and a sliding gross weight at the other, with the latter end or portion made adjustable by sliding devices that shortened or lengthened the leverage. Also that a fixed leverage in beam scales is old, and that the mere indication of the weight, by screw adjustment, is not new; none of such, therefore, do I claim.

But I claim the arrangement, substantially as shown and described, of the two screws, E and J, with, at opposite ends, and forming part of the double beam, B D, in combination with the nubs, F K, and weights, G L, all constructed and operating together, essentially as set forth, for the separate and simultaneous adjustment of the tare and gross weight from fixed points or distances at opposite ends of the beam, in manner and for the purposes described

STOVES AND FURNACES FOR R. R. CARS, &c.—D. G. Littlefield, of Albany, N. Y.: I claim a fire pot or furnace provided with a series of enlargements or projections on its side or sides, commencing at and extending upwards from the grate to contain the fuel while it is being burned or during its consumption, substantially as described, open or provided with openings at the top for the escape of the gaseous products of combustion.

I also claim a grate made around a solid center or disk, substantially as described for the purposes set forth.

I claim a supplying cylinder in combination with the above described fire pot or furnace or grate, or either of them.

BENCH PLANES—Ebenezer Mathers, of Morgantown, Va.: I claim the construction of bench planes with the stock in two pieces, connected by a metal cap, as set forth.

R.R. CAR SEATS—G. T. McLauthlin, of Boston, Mass. I claim connecting the back of a railroad car seat with the body of the chair by means of springs and catches, or their equivalents, whereby the back is made self-elevating when relieved from the catch which holds it, in the manner substantially as set forth.

Second, I claim, in combination with the chair seat and its support, the annular ring, P, for the double purpose of a spring for the seat, and to prevent the seat from unnecessarily rocking or moving on its support when occupied, substantially as described.

HANDLE FOR VISE—J. T. Ogden, of Boston, Mass.: I claim uniting the vise handle with the head of the screw by means of the swivel joint operating in the manner substantially as set forth.

SCYTHE RIFLES—E. J. Post, of Vienna, N. J.: I claim corrugating the surfaces of scythe rifles, substantially in the manner and for the purposes set forth.

BOTTLING LIQUIDS UNDER GASEOUS PRESSURE—Alphonse Quantin, of Philadelphia, Pa.: I claim the compound apparatus composed of metal or other substances, constructed and operating substantially as described, that is, to introduce a certain portion of the liquid into the apparatus, and force it out by the action of another liquid, gaseous or fermented.

LAMPS FOR BURNING ROSIN OIL.—Prentice Sargent, of Newburyport, Mass.: I claim the annular air reservoir, P, in combination with the entry space, T, and inwardly projecting lips, o p, substanttally as described, for the purpose of rendering the outer draft sufficiently constant to prevent the smoking of the lamp by any gusts of air or sudden movement to which the lamp may ordinarily be subjected.

I also claim the fine apertures or meshes, n n, opening into an outer chamber, S, in combination with said chamber, and with an inner perforated or reticular partition, separating said chamber from the inner draft tube, substantially in the manner and for the purposes described.

PEGGING BOOTS AND SHOES—George Schuh and Phineas L. Slayton, of Madison, Ind.: We do not claim the plates or tables, P' O', and rack, Q', attached to the shaft, N', for the purpose of feeding the boot or shoe to be pegged, as these devices are applied in the pegging machine of J. J. Greenough, patented Jan. 11th, 1854; nor do we claim the vibrating frame, J', and screw, L', as they are employed in the pegging machine of Joel Robinson, patented Oct. 31, 1852.

But we claim feeding the boot or shoe to the plungers, D' I', so that it may be punched and pegged by means of the combination of the screw, S', plates, P' O', shaft, N', frame, J', and pins (d'') arranged and operated substantially in the manner described.

Second, We claim punching the necessary holes in the sole, and driving the pegs therein, by means of the plungers, I D', fitted within separate cylinders, the points and awls, g, on one plunger, I, making the necessary holes in the sole at one stroke, and the other plunger, D', being driven down, and forcing the pegs in the sole by the plunger, I, at its succeeding stroke, substantially as shown and described.

Third, we claim the friction block, X, operated by the cam, U, for the purpose of regulating the stroke of the plunger, I, and also the force of its blow, as described.

ATTACHING HUBS TO AXLES—H. B. Simonds, of West Hartford, Vt.: I claim securing the hub, A, upon the arm, b, by means of the clutch, C, screw, D, and clamp or box, E, the inner end of the clutch being of semi-cylindrical form, and having a flange, f, on it, which flange is fitted in a groove, c, in the outer end of the arm; the screw, D, passing through the outer end of the hub into the clutch; and the back part of the arm having a collar, d, upon it, which collar is fitted in the back end of the hub, said collar being covered by a cap or box, E, having a washer, g, within it, substantially as described.

AIR ESCAPES FOR PUMPS—Hiram Smith, of Norwalk, Ohio: I claim the employment of tubes, s s', arranged to take the accumulating air from the top or upper portion of the receiving valve chambers, and conduct it below the valve seats into the water discharge of the pump, substantially as specified.

GANG PLOWS—Aaron and T. S. Smith, of Troy, Ill. We claim combining the axle, B, and wheel, J, with the bed piece, A, when constructed and arranged substantially in the manner and for the purpose set forth.

CORN SHELLERS—J. P. Smith, of Hummelstown, Pa.: I claim grooving the shelling cylinder around its periphery, and extending the teeth of the breast beam therein, in combination with the arrangement for adjusting said breast beam to different degrees of inclination, to suit the different condition of corn to be shelled, substantially in the manner and for the purposes set forth.

TANNING APPARATUS—Abraham Steers of Medina N. Y.: I claim the apparatus described, or its equivalent, to charge the skins stretched on a frame with a thin stratum of tan liquor, constructed and operated substantially as described, and for the purposes essentially as specified.

CANDLE DIPPING MACHINES—Vincenzo Squarza, of New York City: I claim, first, the employment of intermittently rotating vertical wheels, C C, or their equivalents, carrying a number of wick frames or wick holders in combination with a rising and falling dipping trough, F, substantially as described.

Second, I claim keeping the dipping trough supplied to the proper level with tallow from a reservoir above, by a valve which is opened by the trough, or by some attachment thereto, every time it rises, substantially as described.

Third, I claim the described method of regulating the supply of tallow to the dipping trough to make up exactly for the quantity taken therefrom by dipping, by the employment of two or more arms, I I' I2, arranged at different elevations on a pivot, n, attached to the trough, so that either one of them can be turned to a proper position to lift the valve in the reservoir.

Fourth, I claim the employment for the purpose of tapering off the points of the candles of a trough, H, of hot water, into which the candles are plunged by the raising of the said trough, while the candles are stationary, substantially as described.

Fifth, I claim the construction of the wick frames in pairs, each pair consisting of a shaft. D, carrying two fixed bars, b b, two sliding bars, d d, to which are attached two pairs of clamping bars, e e and e' e', and of two wick boxes. g g', all the said parts being arranged and operating substantially as described, so that each frame of the pair may, in its turn, be supplied with wick, as required, to commence a new batch of candles.

Sixth, I do not claim the reduction of dipped candles to a uniform size, by passing them through draw plates. I claim constructing the draw plates in two parts attached each to the jaw or jaws of one or more pairs of nippers, whether attached rigidly or to rollers fitted to the said jaws, as described.

Seventh, I claim the swinging frame. P P, with its jaws, R R', and rotary cutters, y y, all operating substantially as described, to take hold of the candles and cut them off when finished.

Eighth, I claim the arrangement and combination of the table, N, which carries the boxes and the jaws, R R', which take the finished candles, substantially as described, that is to say, having both the table and jaws on shafts or centers, and gearing them together, so that they will move sn such a way, as to deposit the candles in the boxes gently and without injury.

SHIPS' CAPSTANS Daniel and Geo. Talcott, of Oswego, N. Y.: We claim the arrangement of the ratchet, I, fastened to the gear, J, with the rathet, R, on the barrel, F, and the traversing pawls, P P, in the head, H, for the purpose of locking the head to and releasing it from each of the ratchets, I and R, substantially as described.

GUITARS—Wm. B. Tilton, of New York City: I am aware that tail pieces have been old and well known appliances on string instruments, and I do not lay claim to such a device.

But I claim the combination of the bridge and rim of a guitar or other stringed instrument by a tail piece being firmly attached to both, substantially in the manner and for the purposes set forth, by which much of the strain is taken from the bridge tree, and its size greatly reduced, as specified, by which the tone of the instrument is improved.

CIRCULAR SAWS—A. L. Whiteley, of St. Louis, Mo.: I do not claim any construction by which the shaft is prevented from having any lateral motion.

But I claim, first, the adjusting of the two saws at the same time towards each other, by means of the swinging arm and its set screws, as described, or in any other way, substantially the same, and without allowing any end play to the shaft.

Second, the combination of the device claimed with the devices, L m n l, for the purpose of adjusting the saw in every direction, as described.

Third, so constructing the adjusting mechanism, that it follows the shaft, when moved around on the arcs.

APPLYING SOLES TO BOOTS AND SHOES—Sylvanus H. Whorf, of Roxbury, Mass., and Charles Rice, of Boston, Mass.: We are aware that a gutta percha sole has been applied to a shoe by melting gutta percha in a mold, and subsequently pressing the shoe therein: we therefore do not claim such.

We are also aware that in bookbinder's presses, and in smoothing irons, the platen of the one and the body of the other has been provided with a spare chamber for the reception of either steam, heated air, or other means of heating, we do not claim such, therefore, as we use heat not for either drying or smoothing alone, but for a different purpose, and in a process of manufacture wherein it has not been before applied in the way we employ it, being used by us for softening or melting gutta percha after it has been applied to a last.

We claim, in the process of manufacturing and finishing shoes, with either gutta percha soles or soles formed of leather or other material, and united to the upper and insole, by means of gutta percha, or its equivalent, and through the agency of pressing mechanism, as specified; our improvement consisting in applying heat within a last by means of a chamber and pipe and steam, or means of heating said last, the same not only enabling the gutta percha of the sole to be softened or rendered adhesive while it is being pressed upon the insole and upper, but also serving to smooth and finish the upper, as described.

HEADING BOLTS—George Woodward, of Brunswick, Me.: I claim the two oscillating shanks or levers, A B, when combined in the manner specified, with the suspended and bent toggles, K L, and the perforated treddle, N

WEIGHING SCALE BEAMS—Wm. Yost, of Goshen, O.: I claim the index marked from the center, both right and left, together with the P and its additions and weights for grain measure.

GRAND PIANOS—D. F. Hazy, of Philadelphia, Pa.: I claim, first, the combining the action of grand pianos with a radiating key frame, in such a manner as to enable me to use a deep and strong pin block, substantially as set forth.

Second, the key, K, with its projection, p, and arrester, in combination with the lever, O, and catches, m, arranged and constructed substantially in the manner and for the purpose specified.

CAST-IRON PAVEMENTS—Pelatiah M. Hutton, of Troy N. Y.: I do not claim the use of cast-iron for pavements, neither do I claim the hexagon or any specified forms of wearing surface to be filled with gravel or any other material.

I claim, first, making an iron pavement of double thickness, or of two courses of iron plates, one resting upon the other.

Second, I claim fastening the two courses of iron plates together vertically, by means of the three way adjustable key, as shown at D, in fig. 2, or its equivalent.

Third, I claim attaching the two courses of iron plates laterally, by means of the pins, E, cast on the upper surface of the lower plates, and the holes. F, cast through the upper plates corresponding thereto, as described, or their equivalents.

Fourth, I also claim the manner of forming and arranging the two courses of iron plates, so as to produce the following results: that the joints formed by the edges with the upper course of plates, are in no case parallel to the joints of the lower course of plates, and where the joints of the two courses of plates cross each other, they do so at right angles in all cases, substantially as described.

RE-ISSUES.

SPARK ARRESTERS—David Matthew, of Philadelphia, Pa.: I claim the combination of the cone and deflecting head with the wire gauze inside of the outer case, to deflect the steam, gases, and sparks downwards, retain the sparks, and allow the expanded steam and gases gently to escape through the gauze.

I also claim forming the chimney of sections, with the base of the upper section, c, enlarged beyond the diameter of the top of the section, E, below it, substantially as described.

DESIGNS.

PARLOR STOVES—S. D. Vose, of Albany, N. Y,

HANDLES OF FORKS AND SPOONS—Theodore Evans, of New City.

Theory and Practice in Mechanics.

W. J. Macquorn Rankine, C. E., on his recent appointment to the chair of Civil Engineers and Mechanics, in the University of Glasgow, chose the above subject for his introductory lecture.

He commenced by showing that in geometry, in rhetoric, and in the fine arts, the Greeks are our masters; but that in physics and mechanics their notions were pervaded by a great fallacy—a double system of natural laws; and that this fallacy of a supposed discordance between rational and practical, celestial and terrestrial machines, continued in force, and appears to have gathered strength, and to have attained its full vigor during the middle ages. In the 15th, 16th. and 17th centuries the system falsely termed Aristotelian was overthrown, and the truth began to be duly appreciated, that sound theory in physical science consists simply of facts, and the deduction of common sense from them, reduced to a systematic form. The science of motion was founded by Galileo, and perfected by Newton; and it was established that celestial and terrestrial machines are branches of one science, that they depend on one and the same system of clear and simple first principles; that those very laws which regulate the motion and the stability of bodies on earth, govern also the revolutions of the stars, and extend their dominions throughout immensity of space. He then proceeded to show many evils which arise from ingenious and practical men not being acquainted with scientific principles, and how often time and money are expended in visionary inventions, particularly perpetual motion. The harmony between theory and practice confers another important benefit, that of raising the character of the mechanical arts, and those who practice them.

Aluminum.

French chemists are devoting themselves with energy, to discover, if possible, cheap and improved processes for obtaining the above named valuable metal. We hope their efforts will soon be crowned with complete success. The celebrated chemists, MM. Rose and Deville, have recently made some improvements in treating solutions of aluminum, but they are still troublesome and expensive.

Scott Russell's Great Steam.hip.

By the late news from England, we learn that the building of the above-named ship, will not be stopped by the failure of its designer, although the work will be somewhat delayed thereby. It is intended to have it launched about the first of August next. It is said that its first trip will be from England to the United States, the port of arrival selected being Portland, Maine.

Hot Air Furnaces.

A correspondent of the *North American Gazette* states that a large proportion of cases of diseases of the lungs are caused by imperfect, heating and ventilating of houses, especially since the introduction of anthracite coal. He condemns hot air furnaces, and advocates the use of steam for heating all large rooms.

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(For the Scientific American.)

Sisal Hemp.

The tropics of both hemispheres contain almost an innumerable variety of trees and plants which yield fibers of all qualities of fineness and strength, from the Sea Island cotton to the bamboo out of which cables are made in China. Of all such plants in tropical America perhaps there are none so suitable to supply the place of hemp as one species of the celebrated Mexican *Maguey*, out of which the Sisal hemp of commerce is prepared. To the ancient Aztec, the different varieties of the *Maguey* was the same as the reindeer is to the Laplander. The purposes they put it to are too numerous to repeat. But it is singular that such observers as Humboldt should have made the statement that they have but one species of this plant there; yet so it is; and until recently it was generally thought in both Europe and the United States that the "great American aloe" or "century plant," which has been naturalized in the south of Europe, was the only plant of the kind that grew in Mexico; and it was imagined that this plant alone subserved the various uses which have been recorded of the *Maguey*. All of this is a mistake, for it is now known that the plant from which the national drink of Mexico is made, called *Pulque*, is an entirely different species of the Agave (*Maguey*) from the one out of which the Sisal hemp is prepared; and the Century plant (great American Aloe) is different, again, from both of these, while the three, probably, do not constitute one quarter of the whole number of the species of the genus *Agave*, which are found in Mexico and in other parts of tropical America. Even in the United States there are three or four species of kindred Genera, one of which, the Bear Grass of the extreme Southern States, is well worthy of attention, from its hardy qualities, and from the fact that it will bear quite hard frosts, while it contains fibers in abundance, although they are not so long, fine, or soft as the Sisal hemp, nor are they as strong; but the Sisal hemp cannot be cultivated north of Tampa Bay, or St. Lucie's Sound, on account of the frost. Yet on these keys, and on the main-land of Florida, within the limits indicated, this plant would produce a tun of fibers to the acre, on rocky arid lands, which would produce nothing else. Here, as in Yucatan, it grows best on lands containing a superabundance of lime, and where its long penetrating roots can search for rich black mold among the clefts and crevices of the rocks. This is precisely the condition of the lands on these keys, and on the southern part of the peninsula of Florida.

Dr. Perrine, who was killed by the Indians in 1846 at Indian Key, and who was our Consul in Yucatan for a number of years, among many other tropical plants introduced here from thence, three species of the Agave, (Aloes) for which service his heirs have since very properly received from Congress a grant of a township of land near Cape Florida. After Dr. Perrine's death, most of the plants introduced by him were lost from neglect, but from their self-propagating qualities these three species of Agave increased, even without any attention being given to them, till either four or five years, when it began to appear clearly that the *Agave Sisalana*, as Dr. P. called it, could be made one of the most valuable staples of the State; this led many to set out and propagate this plant. About 1000 plants can be set on an acre, and it takes them from three to five years, according to the quality of the soil, to come to such maturity that the lower leaves can be cut from the plant, and the fibers separated from the pulp, for market. The bottom leaves can continue to be cut from the plant from time to time, leaving enough on the top to keep it healthy, for five or more years; and from the great numbers of young plants that continually come up from the lateral roots, by proper care in keeping new plants coming forward at the right distances apart; and by applying coarse manure from time to time, the same land will never require re-planting.

It is said that this plant is not cultivated at all in Yucatan, but I find that it is as much benefited by keeping down the weeds and grass as any other plant; yet the amount of culture that it requires is really very little, and it is certainly no longer an experiment as it regards the growth of the plant, or of the value of the fiber in market, for there have been already many tuns of it got out and sent forward; and when properly cleaned, it brings about the price of the best Manilla; or if there is any difference in favor of the latter, it is not more than 1-2 to 1 cent per lb. Cleaning the fiber from the pulp of the leaf is the most expensive operation at present, yet even in this respect enough has been done to show that it can be got out at a profit by the present imperfect means.

It is the chief purpose of this communication to inform the numerous inventors who read your widely circulated paper of the nature of the operation that has to be performed, and the difficulties in the way of cleansing these fibers. This plant, like all other species of the same genus, sends out long fleshy leaves from a low central stalk, which, before it goes to seed, increases to the size of a man's body; and when the lower leaves are not cut off, the plant does not grow more than six feet high, uutil the "seed spike" appears, which happens in this climate in from seven to eight years; but when the lower leaves are used for their fibers this "spike" is cut off, which causes the plant to produce three or four years longer than it otherwise would. If this spike be allowed to grow, it shoots up a single smooth stem, thirty or forty feet high and a foot in diameter at the top of the circle of leaves, which circle is twelve feet across. Near the top, the seed spike throws out lateral branches, on which are produced the flowers, seeds, and, finally the perfect plant in miniature, after which they are detached by the wind and scattered in a large circle, and germinate where they fall. These little plants look very much like a small shuttlecock. After the plant has gone to seed it dies. I am thus particular in describing the plant because a writer in the *National Intelligencer* calls it a species of *Cactus*. It bears about the same relation to any plant of that genus as it does to an apple tree.

(Concluded next week.)

Circular Saws.

MESSRS. EDITORS—It is usual to determine the pitch of the teeth of a saw by a line drawn from the point to the circumference of a circle struck from the center of the saw. This circle should never be less than two-thirds the diameter of the saw, and for sawing soft timber it may be even greater. A fifty-inch saw should measure at least two inches from the point to the throat of the tooth, in order to give ample room for the sawdust. If the lines forming the teeth were continued straight, such an angle would be produced at the root of each tooth, that it would be liable to break. It is therefore advisable to connect the teeth by a circular line whose radius should be about one-fourth or one-third the length of the tooth.

In order to secure the greatest possible amount of pitch, without any sacrifice of strength, the front of each tooth should be a curved line.

In dressing saws, the teeth should be filed perfectly true, and the points spread to fill the gauge on each side. The teeth should not be set, as they are thereby rendered much more liable to break out, because the strain, instead of bearing equally on each side of the tooth, is mostly on the side to which it is set.

It is very seldom that a spread tooth breaks out, but when a set tooth strikes a knot, it sometimes receives more set, which, at each succeeding revolution, increases, until the tooth breaks.

J. W. GAREY.

Grenada, Miss.

Manufacture of White Lead at the West.

MESSRS. EDITORS—Having under consideration the great varieties of business now being established in this city, and the facilities for transporting the fabricated as well as the raw material, to other parts of the States, and counting up the vast quantities of lead annually raised from the mines, in the vicinity, and the great quantity of white lead yearly used through all the rapidly-growing towns in the interior of this State, and all the towns on the upper Mississippi, I have thought it advisable to invite the attention of some of your eastern capitalists to the fact, that there is not a white lead manufactory this side of St. Louis, Mo., to my knowledge, and that a factory of this kind, established and carried out on a scale commensurate with its demand here, could not possibly prove otherwise than remunerative.

Dubuque contains about 16 000 inhabitants, and I venture to say there is not another city west of the Alleghanies, that has better prospects for an exceeding great city.

W.H. WHITE.

Dubuque, Iowa, March, 1856.

Winds of the Northern Hemisphere.

Professor Coffin, of Lafayette College, Pennsylvania, in an elaborate scientific paper, says that there exists in the Northern hemisphere three great zones of wind, extending entirely around the earth, modified and, in some cases, partially interrupted by the configuration and character of the surface. The first of these is the trade wind, near the equator, blowing, when uninterrupted, from northeast to southwest, this belt is interrupted, however, in the Atlantic Ocean near the coast of Africa, upon the Mediterranean sea, and also in Barbary by the actions of the Great Desert. The second is a belt of westerly wind nearly 2000 miles in breadth, between latitude 35 and 60° North, and encircling the earth, the westerly direction being clearly defined in the middle of the belt, but gradually disappearing as we approach the limits on either side. North of this there is another system of winds blowing southwardly, from high northern latitudes, and gradually inclining towards the West as it moves into a latitude of greater eastern velocity.

Curious Mountain in California.

In Tuolumne Co., Cal., there is a very peculiar mountain, from which great quantities of gold have recently been obtained. It is composed of old lava or basalt resting on ancient gravel and other depositions from water. On its top, it is as level almost as the waters of a lake, only descending very uniformly to the west. Its hight above the surface of the surrounding country varies, from one to five hundred feet. Its width is generally not far from a sixth of a mile, though differing in different places. But its remarkable peculiarity is that, through its length, which is some fifteen or eighteen miles, it winds and curves with other variations in exact resemblance to a vast river; just exactly as it would, had it once been disgorged, a molten, fiery flood, from the old burning Sierra volcanoes, and poured down the deep channel of some vast river, bearing on with its mighty current, quantities of rocks and pebbles and sand, mingled in and formed into a part of itself upon its edges, filling up the whole bed of the river, and then all cooled down into a moveless solid mass. From its shape, it has received the name of "Table Mountain." Various tunnels have been made by miners, through the hard basalt, to reach the bed of the ancient river, and there is a wild excitement among California miners, regarding the immense treasures supposed to be under the lava.

The Lost Marine Telegraph Cable.

The London *Shipping Gazette* of the 18th Feb. contains a letter from Cyrus W. Field, of this city, now in London, announcing his failure to procure a settlement of the Company's claim on the London underwriters for the loss of their electric cable. This occurred, as our readers well remember, last summer, between Newfoundland and Cape Breton, in consequence of a storm that compelled the captain to cut the cable, in order to save the vessel in which it was embarked. Mr. Field says that one of the underwriters told him "there was no loss, the cable being at the bottom of the sea, *just where you w shed to put it!*" This is a pretty good joke at the expense of the owners. Mr. Field has ordered the preparation of a new cable, which shows the spirit of the American company. Its members are determined to carry out their object, and construct an Atlantic Telegraph Line. The leading personages among them—Peter Cooper and others—are of that class of our go-ahead men who "never say *fail*."

Steam Engines.

In the advertisement of J. H. Lester, which appeared in our last number, it is erroneously stated that there was no difficulty in obtaining 95-horse power with a pressure of 80 pounds of steam. It should read 65 instead of 95.—The 6 got wrong side up.

Chancery and Jury Trials in Patent Cases.

In the course of a hearing on a motion in one of the India-rubber cases in Philadelphia, before Judge Kane, on Feb. 23, the question arose whether issues should be sent to a Jury in order to try certain questions of fact which were raised in the pleadings. These questions of fact were raised and insisted upon by the counsel as the turning point in the controversy, the determination of which would be decisive of the suit. Counsel were heard for and against the motion, and Judge Kane, in the course of delivering his opinion, made the following remarks upon jury trials:—

"When an action is tried in this Court at law, it is the aim of the Court that questions of fact shall be decided by a Jury, though we may sometimes err in determining what is a question of fact, and are bound therefore to submit to the rebuke of our superiors in office when we do make such errors; yet that ought not to withhold us from exercising those functions which in a proceeding in equity devolve upon us as chancellors. Where a bill is filed I hold that it is not the right of a party to claim a trial by Jury. I hold that the chancellor relieves himself from an apparent and not a real responsibility if he devolves the determination of a question of fact upon a Jury, when his own conscience does not doubt, and does not need the instruction which a verdict can give. In the limited experience which I have had upon this bench I have never known an issue out of Chancery that has guided the action of the Court satisfactorily. I have myself for many years invariably declined the ordering of a feigned issue in a patent cause unless there was clearly some question of simple fact entirely unconnected with the history of the patent and with the terms of the patent itself. I have found that in those cases in which a suit had originally been brought at law, and there has been a verdict rendered, it has not had the effect of putting an end to the litigation as certainly and as satisfactorily as where a proceeding has been conducted according to the form of Chancery. Such at least has been my experience. Nor do I know that a case can be presented to my mind in which I would order an issue to be tried at bar in a Chancery case, unless after the proofs were in and the case was ripe for a final hearing before me, I found that there were points of fact upon which I would like to consult the consciences of twelve men taken from the community at large."

Treatment of Scarlet Fever.

As the scarlet fever is very prevalent at present, it may be of great benefit to many persons to publish two simple methods of treatment for the disease, in its earlier stages. The one is to rub the entire body of the sick with a soft lubricating substance—a piece of fat pork has been used for this purpose. It is stated that it softens the skin, opens its pores, and produces a soothing influence on the patient.

The other plan is to dissolve some saleratus in warm water (about one-fourth of an ounce to the quart,) and bathe the patient's body with this, at a milk heat. A soft sponge is employed in bathing the body, and a soft towel used for drying. This operation should be done rapidly in a comfortably warm apartment, and the patient placed in bed as soon as possible afterwards.

The alkaline solution, it is stated, removes scurf from the skin, softens it, and promotes perspiration. Both methods, to our knowledge, have been tried with good results; but we do not present them as substitutes for any method of treatment practiced by physicians; the throat affection—the most dangerous connected with this disease—must be treated locally for itself.

Draper's Mill-Stone Dressing Machine.

In the description of the engraving of this invention, published in No. 24 of the present Vol., it was inadvertently stated that the machine rested upon and revolved with the stone. It should have been said that the machine rested upon the stone but did not revolve, except when moved by hand. The driving cam is the only portion of the machine that has regular rotation.

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New Inventions.

Friction Matches.

We havelately received a number of letters requesting information relating to the composition employed in making friction matches. The following is an answer to such inquirers, and all others to whom it may be useful.

The first lucifer or friction matches used were prepared with sulphur, chlorate of potash and gum. The ends of these, when dipped into a bottle containing asbestos moistened with sulphuric acid, took fire at once. Such matches have been superseded by the more simple locofoco matches, which ignite by friction without the aid of an acid. These matches are first dipped into molten sulphur cooled, then coated with a composition of 16 parts, by weight, of gum arabic, 9 of phosphorus, 14 of niter, and 16 of fine peroxyd of manganese, and a little sulphuret of antimony. These ingredients are worked up with water to form a thick paste, into which the matches are dipped, and then dried. Smalt and cinnabar are employed to color the ends of the matches. Those matches which ignite with a small crackling noise, are prepared with the chlorate of potash. It is a dangerous substance to use in their preparation. When it is employed care must be exercised that the gum paste in which it is mixed with the phosphorus, does not exceed 104° Fah. These matches are dried in a dry and warm (but not hot) room.

On October 24th, 1836, Alonzo D. Philips, of Springfield, Mass., obtained a patent for manufacturing locofoco matches with a preparation of chalk, phosphorus, and glue. An ounce of glue is dissolved in warm water; to this is added four ounces of fine pulverized chalk, and stirred until it forms into thick paste. One ounce of phosphorus is then added, and the whole kept a little warm and well stirred until the whole are well incorporated together. Into this the ends of the matches—which have been previously coated with sulphur and dried—are dipped, and then laid in rows on slips of paper cut wide enough to lap over the ends of the matches.

Covering Railroads.

A correspondent writing to us from Fire Island, points out the benefits of enclosing a railroad its whole length, like a long shed. He asserts that the whole expense of enclosing our northern railroads would have been saved this last winter alone, by such a protection of the track from the snow. He says :—

"By housing the road, the ties and the rails would be preserved, and a part of the expense thus saved, and in the long run I have not doubt it would result in a profit to the concern, and will eventually be put in practice. Railroads are a great invention, but as they are now built and conducted I consider them in a state of barbarism. I look ahead with a good deal of anxiety to the time when they will all be covered, and thus made more comfortable and profitable."

These ideas of our correspondent are well worthy of attention. At present, with such an amount of smoke as is emitted from our locomotives however, a covered railroad is out of the question, except by using a tier of huge inclined ventilators along the whole roof.

During winter, in the northern States, covered railways would pay, no doubt, and prove very comfortable; but we certainly should want the roofs taken off during warm weather. The covering of the Grand Trunk Railway in Canada was proposed by Wm. Lyon McKenzie about two years ago, and for that country, where the snow is generally deep in winter, some such plan is certainly required.

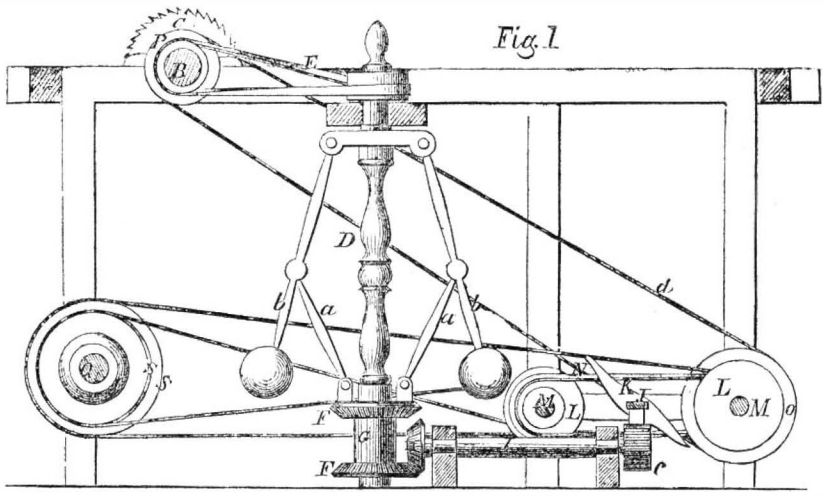
Pressure of Steam in Boilers.

Mr. Anderson, the Inspector of Machinery in the Arsenal at Woolwich, Eng., has issued a pamphlet giving directions to engineers and firemen in the management of steam boilers. He commences by stating that the pressure within a boiler is greater than is generally supposed. With a pressure of 50 lbs. per square inch, it amounts to 7200 lbs. on every foot of surface exposed to the steam, amounting frequently to many thousands of tuns in the boiler, thus accounting for the enormous havoc made by explosions. The joints are weaker than the solid parts; good boiler plate will withstand from 56,000 lbs. to 60,000 lbs. per square inch of sectional area; the joints will give way at about 34,000 lbs., which shows the importance of seeing that the rivets and other fastenings are always in sound condition. Explosions are divided into four classes, and the causes of each explained, from want of strength, deficiency of water, heating of plates, and the variety of other circumstances. On the duty and economy of fuel, the steam generating power of Welsh coal is given as 9 1-2, anthracite 9, and Newcastle coal 8. The following are a few hints on general boiler management :—See that the supply of feed water is uniform and regular; let no steam blow off at the safety-valve; heat passing from the boiler is a dead loss; see that there are no crevices to let cold air into the flues but through the fires; take care that every ounce of fuel does its duty; have the steam always up to the required pressure by the hour of starting; and remember you are entrusted with valuable property, and that a little carelessness may involve immense damage, and the destruction of human life.

These instructions are sensible and correct, and may be extended to "all whom they may concern."

IMPROVED AUTOMATIC GOVERNOR FOR SAW MILLS.

Fig. 1



New Saw Mill Governor.

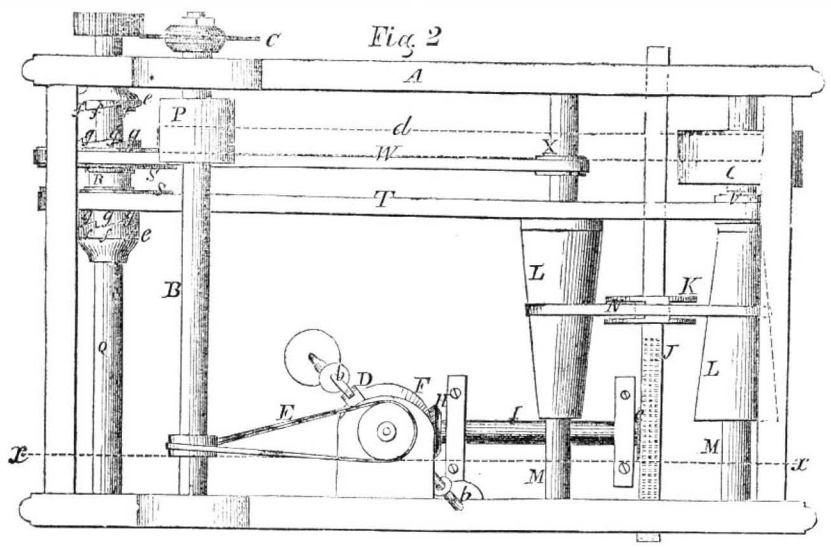
Logs, as they come from the forest to the saw mill, are generally larger at one end than the other. If the butt end of the log is first presented to the saw, more power will be required than when the smaller end is being cut—and *vice versa*. Again, when circular saws are used, they are liable sometimes to bind, or choke up, and there is danger of breakage to the machinery.

The object of the present improvement is to equalize or govern the power, in such a manner that the force brought into requisition shall be just equivalent to the work to be done; so that, for example, if the saw is cutting from the large to the small end of the log, the power will correspondently diminish; or if the saw is cutting from the small towards the large end, the power will accordingly increase—a steady movement in the speed of the saw being thus always maintained.

Another feature of the improvement consists in its adaptation to the stoppage of the sawing machinery when the saw chokes; but the stoppage does not take place unless the efforts of the governing apparatus to clear away the impediment by letting on more power, prove ineffectual.

Referring to the cuts, fig. 1 is a side sectional elevation, and fig. 2 a top view A is the frame, B a saw shaft placed on the upper part of frame, C a circular saw, D a ball governor of usual construction, driven from the saw shaft, B, by belt E. The lower part of the governor shaft has two bevel gear wheels, F F, upon it, which are connected to arms, *a a*, attached to the

Fig. 2



ball arms, *b b*. The bevel wheels, F F, are attached to the upper and lower ends of a collar, G, which slides on the governor shaft. H is a bevel pinion at the end of a horizontal shaft I. The pinion, H, is placed between the two bevel wheels, F F, and gears into either of them according as the collar, G, is raised or lowered by the action of the balls of the governor. On the opposite end of the shaft, I, there is a pinion, *c*, which gears into a rack bar, J, having an arm, K, attached to it, the ends of said arm being slotted. L L are two cones, the shafts, M M, of which are parallel with each other. One cone is placed in a reverse position to the other, as clearly shown in fig. 2. The rack bar, J, is placed between the two cones, L L, and slides in proper bearings on the framing, A. N is a belt, which passes around the two cones, L L, the belt fitting in the ends of the slotted arm, K. On the shaft, M, of the outer cone, L, there is attached a pulley, O, which has a belt, *d*, passing around it, said belt also passing around a a pulley, P, on the saw shaft, B. Q is a shaft at the lower part of one end of the framing, A. This shaft, Q, has a collar, R, placed loosely upon it, and at each end of the collar a pulley, S, is attached. One of these pulleys has a belt, T, passing around it, said belt also passing around a pulley, V, on the shaft. M, of the outer cone, L. The other pulley, S, has a cross belt, W, passing around it, said belt also passing around a pulley, X, on the shaft of the inner cone, L. The collar, R, on the shaft, Q, is placed between two hubs or bosses, *e e*, attached to said shaft. The inner surfaces of these hubs or bosses have ratchet teeth or inclined projections, *f*, upon them, and the outer sides of the pulleys, S, have also corresponding teeth or projections, *g*, upon them, see fig. 2. The hubs or bosses, *e e*, are placed at such a distance apart that when the teeth or projections, *g*, of one pulley are in gear with the teeth or projections, *f*, of one hub or boss, the teeth or projections, *g*, of the opposite pulley will be out of gear with the teeth or projections on the opposite hub or boss—see fig. 2. The shaft, Q, as it rotates, gives motion to the saw mill carriage by means of a rack and pinion. The carriage is of the usual construction. The feed motion is given the shaft, Q, by the cross belt, W, passing around pulley, X, of the inner cone shaft, M, and the gigging motion of the shaft, Q, is given by the belt, T, passing around pulley, V, of the outer cone shaft, M. As the saw shaft, B, rotates, motion is given the governor, D, by the belt, E, and motion is given the cones, L L, by the belt, *d*; and motion is given the carriage on which the log is placed by the shaft, Q, as previously stated, motion being given the shaft, Q, by the belt, T. When the butt or thick end of the log is being sawed, the saw has considerable work to perform, and consequently the carriage moves moderarely along, and gradually increases in speed as the thickness of the log diminishes, in consequence of the arm, K, moving the belt, N, along on the cones, L L, the arm, K, being operated by means of the rack bar, J, and pinion, *c*. If the saw, C, binds, and rotates very slowly in consequence, the collar, G, on the governor shaft will be depressed, and the upper wheel, F, will gear into the pinion, H, and a reverse motion will be given the arm, K, so that the belt, N, will cause the inner cone to rotate slower than the outer one, and diminish the feed, and if the saw still continues to bind so as to bring it down to less than its required number of revolutions, the arm, K, will cast the belt, N, off on a loose pulley at the large end of the inner cone, L and the feed will then be stopped until the carriage is gigged back and the saw relieved.

The above invention is extremely simple, and is self-acting; the log is fed to the saw as fast as the saw can cut, the feed of the log increasing as the log diminishes in thickness, or according as the work of the saw diminishes. Mr. Henry C. Green, of Clarence, Wis., is the inventor of the foregoing improvement. His patent bears date December 18, 1855. Address the patentee for further information.

Great Destruction of Steamboats.

The accounts from St. Louis and Cincinnati describing the destruction of so many steamboats during the recent breaking up of the ice-bound Ohio and Mississippi rivers, have filled us with deep regret. The loss of steamboats at Cincinnati was considerable—four being destroyed. But it was nothing at all in comparison with the immense destruction of steamboats at St. Louis. On the 26th ult. the river commenced to break up at 2 o'clock, P. M., and soon carried thirteen boats down on the sand bars below the city, where they were cut to pieces by the huge blocks of floating ice. At 7 o'clock in the evening, the river having risen still higher, ten other boats were torn from their fastenings along the levee and crushed to pieces. Respecting this great calamity, the St. Louis *Democrat* says :—

"Frequently as St. Louis has experienced great reverses of fortune by fire, and flood, and pestilence, and marvelous as has been its rise after each reverse, we must yet consider this as one of the most disastrous that has befallen it. All the business interests of the city were looking forward to the opening of navigation, with a confidence and cheer rarely felt before; and now, just at the moment when all our rivers would have been covered with merchandize, a large part of the vessels that were to have freighted it have been blotted out in a single day."

Criticism on the Steamship Persia.

The *Nautical Magazine* condemns the model of the *Persia*. It says:—"If the *Persia* drew 18 feet of water, (instead of 24,) with the same amount of displacement, the resistance consequent upon pressure would not only be greatly relieved, but that 6 feet might be taken from her depth, which would have reduced the weight of the ship and rendered her motions less sluggish, because the great bulk of the weight thus removed, would have been taken from the ends, which are always heavier than other parts of the vessel of equal surface."

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Scientific American.

NEW-YORK, MARCH 15, 1856.

Reduction of British Patent Fees.

An effort is about to be made in England to rescue from Government the large and increasing surplus accruing from the patent fees, after deducting the expenses of the Patent Office. The gross receipt for fees amounts now to about £95,000 (about $475,000) per annum. The expenses of the Patent Office are not so much as its receipts, into a considerable sum, the profits for last year amounting to £60,000. It is to prevent, if possible, the Treasury from acquiring a vested interest in this surplus that steps are now taken to prevent the diversion of this fund from other than for Patent Office purposes.

The attention of the council of the Society of Arts was recently directed to the subject by Sir Joseph Paxton, in a letter which he addressed to them as one of their vice presidents. He asserted that the Patent Office of England ought to be a national institution in the most comprehensive sense of the word. Such an institution, he said, would become the truest and best endowment of inventive genius. In consequence of his representations, the council appointed a committee of more than 60 members of the society, distinguished as inventors, or interested in the progress of the arts, to consider the subject. This body adopted the following resolutions :

1. That a deputation of patentees and others seek an early interview with the Prime Minister, in order to impress on him the importance of saving the surplus revenue of the Patent Office from absorption into the general public revenue.

2. That it is highly desirable to place the Patent Office on a footing correspondent with the paramount industrial position of the country ; and that steps be taken to press upon the Commissioners of Patents, upon the Government and the Legislature, the propriety of having the surplus appropriated to that object.

As the British patent fund is not exclusively the product of British contributions, we claim to have a voice in the disposal of it, and in the name of *our* inventors, who pay a considerable amount yearly into it, we ask for a reduction of British patent fees.

The British patent fees have been greatly reduced from what they were previous to 1852, but they are still too high. They may be still further reduced one half, and yet pay all the expenses of the Patent Office handsomely. We hope British inventors will begin and advocate this reform and press it vigorously upon Parliament. The English patent laws were made for rich, not for poor inventors, and it is well known that the great majority belong to the latter class. There is not one English journeyman in ten who is able to pay the large patent fees charged for protection. When an English journeyman mechanic invents a useful machine, he has to seek the patronage of a more wealthy person to enable him to secure his invention. He is, therefore, obliged to place himself in the power of another person or lose the benefit of his invention. Such a system is too strongly feudal for the present age, and we call upon Sir Joseph Paxton, who was once a journeyman himself, to devote his energies, first, to the removal of this, the greatest evil connected with the English patent system. We admire the efforts he has made to secure the surplus patent fund from the grasp of the government to save it from being used like the general revenue, but we believe the best and most just way of benefitting inventors, is to reduce the patent fees.

When the subject of "patents" was brought before the late meeting of the British Scientific Association, held in Glasgow, it was refreshing to inventors to hear the sentiments expressed by such distinguished men as Sir David Brewster, Fairbairn, and others, regarding the fees charged inventors in England for patents. The combined opinion of these savans was, that patents ought to be granted to inventors *free*. They considered that inventions conferred great public benefits upon the country, therefore the public could well afford to grant patents to inventors without charging them for the privilege. We could also advocate the same policy as a measure both wise and politic for our country, but as politicians would always be growling at the necessary appropriations for the Patent Office,—our inventors, we know, would disdain to have it insinuated that they were the least burden upon the country. For this reason, therefore, we advocate moderate patent fees—the lowest possible to pay the necessary expenses of the Patent Office, and no more. And as Judge Mason has recommended a reduction of our patent fees to British subjects, we hope English inventors will also zealously advocate a reduction of theirs for their own benefit and that of our inventors who may desire to secure patents in that country.

Gold and its Uses.—No. 2.

GATHERING GOLD IN CALIFORNIA—Various plans have been tried for gathering the gold of California, and a correspondent, J. Tavanay, M.D., of the San Francisco *Chronicle*, states that immense progress has been made since 1850 in securing gold at various diggings. He says :—

"At first the pan, then the rocker was sufficient to enrich many a miner. The tom and the riffle-box followed. After these came the sluice, as more expeditious and simple. The above means are applicable only in rich ground in the best localities; the pan, in particular, becoming useful only where the gold is thick, as, for instance, in the famous Table Mountain, where one needs only to stoop and pick it up. In a short time that active, enterprising, go-a-head spirit, (so peculiar to Americans, and well typified in their poet's motto *excelsior*,) which ever urges them forward, devised such means as are now used to level hill and plain, filling up gulches, ravines, &c., and in certain parts upturning and changing the whole aspect of the country. There are means by which many now amass fortunes, where they would have starved had they been riveted to the first methods in use.

Ground sluicing, which has produced immense results in certain places, and more particularly along the American river, is far from being the *ne plus ultra* of washing on a large scale. That which carries the palm at present, where practicable, is effected by means of a hydraulic tube. At Coon Hollow, Auburn Neveda, and a few other such privileged places, mountains have been leveled with the plain by this process. It consists in conducting the water to the top of a hill partly composed of a thick layer of auriferous soil; the water is let down through a solid tube of wood, or through a strong hose of canvas, leather, or caoutchouc, which coils down the side of the hill from the hight of 100 or 200 feet, sometimes more; this tube terminates in a nozzle, through which a torrent is shot with the force of gunpowder by the pressure of six or seven atmospheres, produced by the weight of the column of water. Thus, fifty or sixty inches in succession of water can be darted through a small opening of one or two inches, according to the hight of the column. The water whistles through the jet, which is directed by one man, and this fluid catapult demolishes and crumbles to pieces avalanches of soil from the hill side, all of which soon becomes a deluge of mud, which finds its way through a large sluice. The largest stones and rocks are got rid of with the hand or by means of levers, (those of six or eight inches diameter are easily carried along by the current,) and the gold is found arrested in its course by riffles and other numerous and simple obstacles placed in the way under a false bottom bored with holes."

EXTRACTING THE GOLD.—Gold is found in exhaustless quantities combined with pyrites and quartz as a matrix, in Virginia, Georgia, California, Australia, and many other parts of the world. Until the gold discoveries of California were made, most of our native gold was obtained by the reduction of the gold from the quartz. The obtaining of gold economically from quartz rocks has incited the inventive genius of many persons during the past seven years, hence there have been a host of quartz crushers and gold extractors invented.

It is believed that when the surface gold has all been picked up in California and Australia, that the vast range of quartz rocks in these countries will afford fields for obtaining gold by machinery for ages to come. The extraction of gold from its parent rock has therefore recently become an interest of great magnitude. Gold is contained in unequal quantities in quartz. Some rocks are rich, others are poor; but millions upon millions of tuns of quartz are believed to contain about eight ounces of gold to the tun. The quartz is first required to be finely subdivided by crushers, to bring it into contact with quicksilver, for amalgamation and extraction. The quicksilver picks up, as it were, the gold from the quartz; the gold is afterwards obtained from the quicksilver by straining the latter through leather and driving it off by heat—the mercury being recovered by distillation. Heat and friction accelerate the dissolving action of quicksilver. One pound of mercury at 212°, after passing through a leather bag, can hold in solution 42 grains of gold, which is upwards of five times as much as it can hold in solution at 60°; hence, if 20 lbs. of mercury were put into a machine for a tun of auriferous quartz, and the mercury heated to 212°, and filtered at that temperature, every pound of mercury which passed through the bag might hold in solution 42 grains of gold, equal to an apparent loss of 1 oz. 1 dwt. gold per tun of quartz. At 90° Fah. 15 grains gold per lb. remain in solution=12 1-2 dwts. gold in 20 lbs. mercury; at 60° only 7·5 grains per lb.=6 1-4 dwts. gold. This difference of solubility of gold in mercury according to the temperature is a matter of great importance in making experiments upon gold quartz ores.

When it is necessary to collect the amalgam from a machine, it should be carefully freed from extraneous matter by a gentle stream of water, after which it may be strained and squeezed either in a leather or canvas bag The amalgam, now freed from superfluous mercury, should be flattened and put into a cast-iron retort and luted with plaster of Paris, then gradually heated, nearly to redness, and kept at that heat for about an hour. All the mercury that is volatized from the amalgam is easily collected by making the back of the retort dip about 1-4 in. under the surface of the water of the receiver. The retort being allowed to cool, the gold is taken out. It is possible to drive off the mercury so completely that the gold when melted shall lose only 0·68 per cent. in weight, but not unfrequently the loss in melting is upwards of 13 per cent. A light yellow color, however, is an indication that the gold from the retort still contains much mercury, especially when the fineness is equal to 23 1-2 carats. Some of the quartz miners, instead of distilling off the quicksilver of their amalgam, subject it to the action of nitric acid, but this acid does not separate the gold completely from the mercury; hence this treatment is expensive and useless.

Progress of the Great Fraud.

We have before intimated that an attempt was in progress to subsidize or bribe Congress, and thus obtain the passage of a bill for the extension of the Woodworth Patent. What cannot be done by fair and honorable steps is sought to be accomplished by foul and treacherous means.

It has come out that an enormous fund has been raised for the purpose above specified. The city of Washington, we are told, is placarded with hand bills similar to the following :—

CAN $300,000

BUY THE UNITED STATES CONGRESS?

MEMBERS OF CONGRESS are respectfully requested to examine "Report No. 155, House of Representative, July 17th, 1852," by which they will see that the WOODWORTH PLANING MACHINE PATENT is making the American People pay **$9,000,000** a year for the use of this Patent, and it is understood that the above sum of $300,000 has been appropriated *to induce Congress to extend this iniquity* for fourteen years from the 27th of December, 1856!

American genius is clogged by this monopoly, and the People are publicly plundered. Therefore, said Patent

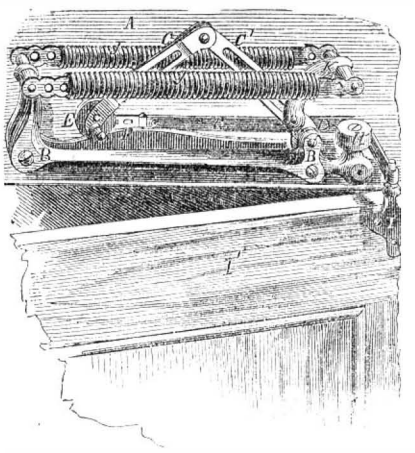
SHOULD NEVER BE EXTENDED!

We have received information from private sources which partially confirms the statement made in the placard relative to a large amount of money being pledged to obtain Congressional votes. It is the most gigantic scheme of corruption that has ever, within the annals of this country, been brought to light. Most earnestly do we hope that it may utterly fail; fail it surely will if our people will but do their duty. Again do we urge our readers to circulate petitions against the extension, obtain signatures as fast as possible, and forward them on to the Representatives of their districts in Washington. We suggest that every individual opposed to the extension should write a private letter to the member in Congress from his locality, expressing his sentiments, and especially warning him against this huge system of bribery. Private citizens have the right, and it is their solemn duty, under such circumstances, thus to address and urge their Representatives.

Recent American Patents.

Weighing Scales—By James Kelly, of Sag Harbor, N. Y., assigned to John Sherry, of same place.—There is a balancing lever of the usual kind, the article to be weighed being placed at one end, the weight at the other. One of the improvements consists in an ingenious application of a thumb screw for moving the weight, whereby greater accuracy and convenience is obtained; the weight is furnished with a pointer, which moves over a graduated scale. There is also another screw, by turning which a pointer is made to indicate the exact tare. For shop uses, and many other purposes, this invention appears to be invaluable.

Improved Door Spring.—By Prof. Amos Westcot, M.D., of the Dental College, Syracuse, N. Y.—This contrivance seems, at first glance, to be rather more complicated than so small an affair as a door spring ought to be. But we think we can show that all the parts here employed are necessary to the production of a good article. If other door springs appear to be cheaper and more simple, the inventor thinks they will be found to be lacking in several important particulars.



In the engraving A is the lintel of the door to which the contrivance is fastened by means of the screws B. C C′ are toggle joint levers, one of their ends being pivoted to the frame at D, and the other end terminating with the friction wheel E. This wheel is grooved on its periphery and traverses on a sharp edge E. The corner end of lever C is furnished with a projection, to which one end of the leather strap G is attached; the latter passes around friction wheel H, and fastens to the pintle, I, upon the door. The spiral springs J J are attached at one end to the frame of the apparatus, and at the other end to a bracket K; this bracket is attached to the lower end of lever C′. When the door I′ is opened, as shown in the cut, the strap, G, pulls upon lever C, causing the wheel, E, to travel up the curve of the edge F. The springs J acting through the bracket K, on lever C′, resist the movement of lever C, and become stretched, but collapse again in shutting the door. The curve of the edge F is so grandulated that the pull upon the door will be less when it is wide open than when nearly shut; slamming is thus prevented. The ordinary springs exercise their greatest power when the door is widest open, and thus impart a momentum which closes the door with violence.

The extremities of the springs J J are looped, as seen, so that they may be shortened at pleasure, and act with more force. The end of the strap, G, is also looped for the same purpose. The contrivance may be instantly thrown out of operation by slipping the end of the strap off from the pintle, I. The spring can be arranged so as to allow the door to remain open, at a certain angle, if desired. The contrivance may be placed upon either side of the

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door, or wholly out of sight within the lintel; it is readily adjusted to suit heavy or light doors. It is said to close the door if open only for an inch, with as much certainty as if it were wide open.

The foregoing are some of the principal advantages of this invention; it has other good qualities, but we have not space to mention them. We can only add that it strikes us as being a very effective, strong, and durable contrivance. We should think it would last ten years as well as one. We have had one of the springs in use on our office door for a short time past, and are pleased with its operations. The price at which they are sold is from $1·50 up, according to size. Mr. E. H. Babcock, No. 3 Courtlandt st., New York, is the agent from whom further information can be ob tained.

Attaching Wagon Wheels to Axles—By Horace B. Simonds, of West Hartford, Vt.—Consists of a peculiar method of attachment, whereby an oil chamber is formed within the hub; said chamber, once filled with oil, will afford perfect lubrication for the axle for a very long period. The entrance of dust is also effectually prevented. Appears to be an excellent invention.

There is an incident connected with this invention that deserves notice. The patent was obtained through our Agency. When the inventor first applied to us for information respecting the patentability of the device, we expressed some doubts on the subject, and rather tried to discourage him from proceeding, especially as he said he was very poor. But nothing could stop him; go-ahead he would, although, in his reduced circumstances, the expense threatened completely to use him up. He managed to pay a portion of the money and was to pay the remainder when the documents were sent to him for execution. The papers were forwarded, and in due time we received a letter stating that he could not then raise all of the necessary funds; that he only had five dollars at hand, which he enclosed; that he had a cow which he had been trying to sell, but had not succeeded; that he expected to sell the animal soon, and would then remit the balance. In a few days more we received another letter, stating that *the cow was sold*, and the money was accordingly remitted. He hoped we would do our best for him, and get him a patent if possible; we said we would. Within a few days past we have received another letter, expressing strong hope that we would succeed in procuring him a patent, as he had been offered *fifteen thousand dollars* for the invention, if granted. The official Letters Patent have, ere this, reached him, and we hope he has received his money. One of his first investments, we trust, will be to repurchase that old cow, and feed her well during the remainder of her natural life.

MORAL—Perseverance is generally sure to bring its own reward. Patent rights for good inventions are not to be despised.

Notwithstanding the success of our untiring friend, we cannot advise every poor inventor to imitate his example and sell his only cow in order to pay for a patent application. Those who have two or more of such animals, however, especially if they are dried up, and refuse to give milk, might with propriety, and perhaps with benefit to their fortunes, send all but one to market.

Machine for Making Tallow Candles—By V. Squarza, of New York City.—This invention is distinguished for the variety of operations which it performs. To produce candles it is only necessary to set the machine in motion, and place in connection with it a tank of melted tallow and a good supply of lamp wicking; the finished candles then begin to drop out with rapidity at the lower end of the apparatus, packing themselves into boxes ready for market, as fast as they issue. The machine manufactures the kind known as "dip candles," which, for illumination, are superior to mold candles. Heretofore, dip candles have been objectionable, on account of their uneven nd unfinished appearance; but by this invention they are rendered as uniform and smooth as the best mold candles.

Machine for Pegging Boots and Shoes.—By Schuh and Slayton, of Madison, Ind.—There are quite a number of different parts and devices involved in this invention, the precise performance of which it would be difficult to describe without drawings. The boot is placed on one part of the machine and a stick of wood on another; motion being given, one portion of the mechanism operates to prick the holes with an awl, another to make the pegs, another to feed the pegs to the mouth of the holes, and another to drive the pegs home. These various operations are performed with great rapidity, about two minutes only being required to double peg each boot.

Novel Fire Grate.—By B. F. Foering, of Philadelphia, Pa.—Certain kinds of anthracite coal, when burned in stoves, produce a a clinker, or lava, that adheres to the sides of the stove, or fills the interior, and prevents good combustion. The clinker generally forms at the lower part of the fire. If there were any means of holding up the fire so that the ash grate could be removed, the clinker stuff might all be easily taken out from below at pleasure. At present, the clinker cannot be well removed until the fire is extinguished, and it is then hard, flinty, and liable to injure the lining of the stove in being broken off. This improvement is intended to remedy the above defects. Apertures are made in one side of the stove, just above where the clinkers form, and through these holes suitable bars are introduced; when the bars are pushed in they form a temporary grating, which supports the fire while the ash grate below is taken out for the removal of the clinker refuse.

Power Loom—By James Greenhalgh, Sen., of Waterford, Mass.—This invention relates to looms for fancy or figured weaving, such as ginghams. It consists in certain improvements in the shuttle-box-motion for changing the shuttles; also in an improvement in the shuttle motion, whereby two or more shuttles can be thrown successively from either side of the loom.

Cooking without Fire.—By W. W. Albro, of Binghampton, N. Y.—This invention consists in a combination of tin cooking dishes placed above each other, the bottom of one vessel fitting into the top part of the dish below, &c. In the lower dish of all, the inventor places a small quantity of quick lime, and then by means of a tube introduces a little cold water; a strong chemical action ensues and intense heat is instantly generated, whereby articles of food, such as meat, vegetables, &c., placed in the other dishes, will be cooked in a very short time. The inventor tells us that a tin contrivance of this kind, not occupying greater space than an ordinary band box, will do the cooking of a family of five persons. It is also adaptable for working-men's dinner pails, enabling them to enjoy freshly cooked and warm meals. We hope, hereafter, to make our readers more fully acquainted with this invention by means of an engraving.

Improvement in Wagon Axles.—By John M. Burke, of Danville, N. Y.—The ends of wagon axles generally terminate with metallic arms called skeins, upon which the hub turns. This invention consists in making the skeins hollow, like a sleeve or ferule, and driving them on to the end of the axles; the sleeve is split for a short distance on one side, which, owing to a slight elasticity of the metal, causes it to bind better upon the wood, especially if the latter is a little uneven. This improvement can be applied much cheaper and quicker than the common skeins.

Corn Stalk Harvester.—By Wm. M. Bonwill, of Camden, Del.—This is a low three-wheeled vehicle drawn by a single horse, the animal walking in the furrow or open space between the rows of corn. On each side of the machine, in front, there is an upright revolving shaft, the lower end of which, near the ground, is furnished with a circular saw. The shafts are put in motion by means of bands or gearing which connect with the wheels of the vehicle. When the machine advances, the saws come in contact with the base of the stalks and they are clipped off in an instant, falling over backwards upon the platform of the vehicle. As fast as a sufficient number of stalks to form a sheave collect upon the platform, they are swept off upon the ground, by the driver, who touches a lever for that purpose. Binders follow the machine, who tie up the sheaves.

Monumental Marble Saws.—By C. Amazeen of New Castle, N. H.—The object of this invention is to reduce four sides of a block of marble simultaneously, all the cuts being parallel, or on a taper, as desired. The improvement consists in certain ingenious arrangements of guides and adjusting screws, whereby the saws may be quickly set to cut at any given angle, and the work done in a rapid and convenient manner.

Gang Plows.—By A. & T. S. Smith, of Troy, Ill.—The agricultural implement known as a gang plow, consists of a frame mounted on wheels—several smaller plows, of the ordinary kind, being attached to the frame. It is used chiefly on light soils, and turns as many furrows, at once, as there are plows—thus saving much labor. The present improvement consists in certain means of elevating and depressing the plows at pleasure, also in a simple method of regulating the width between the furrows. It is a highly useful invention.

Merrill's Hoisting Block.—We are requested by the inventor to say that his address is Wm. H. Merrill, Taunton, Mass., instead of H. Merrill, as stated in the description of the above improvement, published in No. 21, present volume.

[NOTE—The official list of claims for patents issued on the 4th inst. will be found in another column. It embraces a large number of inventions, some of them of great importance and value. About one-third of the whole number granted were obtained, as usual, through the Scientific American Agency.

Persons wishing for information relative to the patentability of inventions may apply to us, either by letter through the mails, or in person. A rough sketch and description of the invention should always be furnished.

American patentees should bear in mind that an invention that is worth patenting here is generally of equal value abroad. The aggregate population of England and France amount to about *sixty millions*. The patent laws in both of these countries are good, and protect American inventors just as thoroughly as they do native-born subjects.

The business facilities between these countries is now so much improved that our countrymen can obtain patents on the other side just about as easily as they can at home Such opportunities should never be neglected

Recent Foreign Inventions.

Fastening Lithographs on Canvas.—L. A. F. Bernard, of Paris, patentee.—This invention consists in transferring and fixing, by means of a composition on canvas or cloth duly prepared, all kinds of lithographic representations and engravings, without removing any particles of the paper on which they are made.

In a vessel specially adapted for this purpose and capable of bearing heat, about a quart of soft water with a spoonful of linseed is placed; this is heated to ebullition for a few minutes, and is then withdrawn and strained, and the product is passed into another vessel. In this 400 grains of white moist sugar, are dissolved and strained through fine linen.

Into a quart of boiling water in a sand bath, 800 grains of white glue are thrown while stirring with a wooden spatula. In about three minutes the liquid is withdrawn from the fire and passed through a strainer. The solution, thus prepared, is mixed with the linseed water and saccharine solution, and the whole is placed again on the fire. When ebullition commences, the inventor stirs it with a camel-hair brush, which he withdraws saturated with the liquid, and passes quickly and lightly over the lithograph or engraving (which has been previously transferred to the canvas to be painted by means of transfer paper, which is entirely removed) up and down, across, and to and fro; thus leaving the drawing completely freed from the smallest particle of paper. This application of the above solution by the camel-hair brush, fixes instantly the drawing to the canvas. The drying of the canvas occupies more or less time according to temperature. It is next coated with varnish by means of a fish-tail brush, and the canvas is ready for painting by the ordinary methods.

Transferring Cullodion Photographs—Alexander Rollasen, of Birmingham, Eng., has obtained a patent for an invention in photographs, the nature of which consists in transferring to paper, linen, ivory, wood, metal, or stone, cullodion pictures taken on glass. The glass plate on which the picture is to be taken is first cleansed with spirits of wine, naptha, and tripoli, and is finally buffed with buff-leather, which has a slightly greasy surface. The glass is then covered with iodized cullodeon, or albumen, and is immersed in a bath of nitrate of silver, to render it sensitive. It is then placed on the camera, the picture taken in the ordinary manner, and afterwards developed by first washing in a solution of nitrate or acitate of iron, then with a solution of hyposulphate of soda. After being well washed in pure water it is dried. If the cullodion be of a very adhesive quality it is sometimes necessary, before drying the picture, to immerse it for two or three seconds in a bath of dilute nitric acid. The picture thus taken is removed from the glass by transferring the film on which it is impressed. When it is perfectly dry it may be colored and tinted on the back, according to the taste of the artist, and then covered with varnish. If it is desired not to color the picture while on the glass it is covered at once with a varnish made of asphaltum dissolved in naptha to about the consistency of cream. The varnish is now allowed to dry to a certain point, namely, when it does not feel sticky to the touch; but it is not allowed to dry further, lest it should crack. It is then coated with a thin solution of shellac, which p events further hardening of the varnish. The next operation is to remove this film of cullodion, with the picture on it, from the plate of glass. A thin mucilage, composed of two-thirds gum arabic and one of honey, is now laid on the varnish of the picture, and if the transfer is to be made on paper, *it* is damped first, and also coated with mucilage. The paper is now laid on the back of the picture, and both are laid flat on a table, and clamped between two pieces of wood. The surface of the paper is then rolled over with a small india rubber tube, to press out the air bubbles between the paper and glass. When the transfer is to be taken on wood or stone care must be taken that the surface is perfectly smooth, and the air bubbles may be driven out by commencing at one end, and laying the picture gradually down, from end to end. When the mucilage is dry enough—which may be ascertained by raising one corner of it—the film should begin to separate itself from the glass. When this is the case, its complete removal may now be effected. A few drops of water are now introduced with a feather between the glass and film, and gradually the picture separates from the glass to the paper. It can be transferred in the same manner on cloth. The surface of the picture is now gently touched up with fine varnish on a pellet of cotton wool, care being exercised not to injure the delicate surface. This varnish makes the surface slightly sticky to receive any of the dry colors for tints. When these are laid on, the transferred picture is complete.—Condensed from Newton's *London Journal.*

Fossil Fishes of California.

Prof. Agassiz reports concerning a number of fossil fishes obtained in California by W. P. Blake, that they mostly belong to the family of sharks. He says:—"No fossil shark's teeth have been found west of the Rocky Mountains before; the discovery of Mr. Blake constitutes one of the most interesting additions to our knowledge that could have been obtained from that quarter, and the importance of these fossils to science, is further enhanced by the peculiar relations they bear to similar fossils found in the Atlantic States and in Europe, and to the sharks now living along the shores of the Old and the New World."

Ding-a-ling, Ding-a-ling.

A correspondent tells us that in the town of Middle Haddam, Conn., *one million* of tea and sleigh bells are made and sold annually. A large portion of all the work done in the place relates to bells. Middle Haddam makes a good deal of noise in the world, after all.

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TO CORRESPONDENTS.

F. A. W., of Miss.—Webster's large dictionary is the best on technical terms. A circular saw, three fe t in diameter describes a line of nine feet and a half, nearly in one revolution. A circular saw cuts exactly according to the number of its teeth and the feed of the board or log. If it has fifty teeth, and each one cuts a quarter of an inch deep, it will cut a line of ten feet in nine four-fifth srevolutions.

J. D., of Md.—The employment of a steam whistle for indicating a lack of water in steam boilers is a very old invention, and is well known to engineers.

When a letter is sent to us without the writer's name, we always pass it at once, as we can neither correspond with the writer nor place his communication on file.

C. C., of N. Y.—You say you have not received any reply to a letter sent to us on the 18th of February, and by way of recreation you go on to abuse us in round terms for "neglecting you altogether, while, at the same time, we gave careful attention to others." We would suggest that it might have been just as well to have left off the abusive part of your letter, and we have no doubt you will feel ashamed of it when we inform you that we replied at length to your inquiries, by mail, on the 24th of Feb., and pre-paid the letter. You forgot to send us a stamp for the purpose. The letter has probably reached you.

J. F. F., of N. C.—Gold has been found in the beds of rivers in California. This fact, we believe, is undisputed.

James Wright, of Florence, Ala., wishes to purchase a machine for sawing veneers, say six feet long and twenty inches wide. Who can furnish him with such a machine, its cost, etc. Address Mr. Wright.

G. W. A. Simpson, of Jackson, La., wishes to purchase some earthenware drain pipes. Will some of our readers please to inform him where they can be procured.

M P., of Vt.—We sent the remonstrance against the Woodworth patent extension to Mr. Sabin, of your State.

John B. Kendall, of Wisconsin—Wishes to procure a machine, if one can be obtained, for working Windsor chair bottoms.

P. R. B., of N. Y.—You had better write to the *Tribune* office for an explanation of the excess of postage charged by the Postmaster. We do not know the reason for the difference in charge. We are not able to answer your inquiries about the relative strength of the British and American navy.

J. J., of Ky.—We have entered your name for six month s subscription. We cannot supply a single number of Vol. 5, Sci. Am.,

E. F. F., of Vt.—We do not give advice under the law of copyright. It is not a part of our business.

L. G., of N. Y.—Vibrating propellers like the tails of fish, have been often proposed, but the action of the common rotary propeller is similar.

G. H., of Ala.—Your buckets obviate water lift in the paddle wheel, but they involve the evil of beating the face of the water, and producing great concussions.

H. N. B., of N. Y.—Your wind mill is very old and not patentable. In Vol. 3 Sci. Am., you will see an engraving of the same plan. Your remarks on the patent laws are noted.

S. W., of Conn.—"Gould's House Carpenter and Joiner's Assistant," is a very good work; you can purchase it at all the large bookstores.

H. P., of Ill.—A ten-horse power engine will run your two set of thirty-inch stones. Be sure and get a good strong boiler—one that will generate plenty of steam.

A. C., of Conn.—The sheet copper for lightning conductors can be obtained in this city at Knox's. 215 Fulton street.

M. J. W., of N. Y.—We cannot give you the information desired respecting the way to estimate the power required in driving a machine like a lathe; it must be measured by a machine called a dynometer; the information desired about water wheels will be found in another column.

J. R. McW., of N. Y.—Cheap soft soap can only be made with cheap materials, such as a cheap oil or grease, and a cheap alkali. If you make your lye of sal soda and quick lime, and use the cheapest grease you can find you will make good soft soap without much trouble.—When, in boiling, the contents of the kettle become ropy, it is a sign that the union of the alkali and grease is effected.

T. G. M., of Hampton Falls.—You are wrong respecting the use of a small boiler and keeping it red-hot to generate steam rapidly. Water, when thrown upon a red-hot iron plate assumes the spheroidal condition and evaporates very slowly. The application of a recoil spring to a saw mill gate is not new: but it is a good device.

A Newbury & Co., of Windham Center, N. Y., wish to correspond with a manufacturer of plow handles.

W. B. Y., of N Y.—We do not discover the slightest novelty in your marble sawing machine; we have seen a score of models which embraced all the features contained in yours.

C. C., of N. Y.—We do not know the name of any firm in Providence engaged in the manufacture of spy-glasses. McAllister & Brother, of Philadelphia are reliable manu actures of such glasses.

T. J. de Y., of N. Y.—Having received a patent upon your device as a pump, you cannot now obtain a new patent for the same thing applied as a churn.

C. P. Lines, of Le Raysville, Pa., wishes to procure reeds for weaving wire; some of our readers can doubtless give him the desired information.

C. C., of Mass.—We have recently had frequent inquiries in regard to J. A. Quimby & Co.; we are not acquainted with them, and therefore know nothing of their responsibility.

C. E., of Mass.—The best way to prepare solidified milk is to concentrate it in vacuum by means of an apparatus for the purpose.

H. McC., of Pa.—You will have as much head of water by using a syphon, as by tapping the box, but the tap will be the most convenient.

D. A. R., of N. J.—We cannot tell you the price of hardened india rubber per pound, such as is used for making buttons. It is slightly elastic, and types might be made of it.

I. H. N., of Vt.—We have repeatedly stated our belief, that the Bain telegraph is entirely different in its nature from that of Prof. Morse, but the friends of the latter assert that every recording telegraph is an infringement.

P. M., of Ill.—We sympathi e with you in regret for the death of your son. He, however, has not lived in vain We will take the other subject mentioned in your letter into consideration.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, March 8, 1856:—

A. M. B., of Mich., $55; S. H., of Mass., $30; W. R. T., of O., $25: H. C. H., of Vt., $35; J. C., of Pa., $20; B. & J., of Mich., $30; W. S., of N. Y., $30; A. G. F., of Ill., $30; H. K., of Mass., $30; W. W. B., of N. Y., $30; J. B., of Ill., $600; E. F., of Conn., $27; J. H. O., of O., $20: J. W. B., of Md., $25; J. W., of Del., $30; S. B., of Conn., $30; R. C. B., of Ill., $30; R. D., of Pa., $35; J. E. N., of Ind., $25; M. & J. H. B., of N. H., $30; J. S., of N. Y., $30; H. W. O., of Conn., $50; W. H. F., of N. Y., $20; R. M. H. & Co., of N. Y., $100; S. T. J., of N. Y., $150; E. C. P., of N. Y., $30; T. E., of Pa., $55; J. C. B., of N. Y., $55; J. J. B., of N. Y., $30; B. F. J., of Mo., $55; P. J. C., of Conn., $30; J. & H. O., of Ind., $30; E. G., of Vt., $30; T. H., of N. Y., $35; W. S., of Pa., $25; J. W. M., of N. J., $30; A. C. F., of Conn., $25: D. J. O., of Pa., $25; J. C. A., of Conn., $30; K. & B., of N. Y., $30; W. D. U., of N. C., $30; A. L. C., of Mass., $30; J. T. B., of N. Y., $25, McG. & B., of La., $25; J. P., of N. C., $200; W. H. L., of S. C., $40; H. & S., of N., $25; J. H. W., of Mass., $25; J. C., of N. J., $30; W. D. T., of N. Y., $50; W. H. F., of N. Y., $10; S. H., of Mass., $25; W. H. B., of Mass., $27.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, March 8:—

J. C., of Mo.; W. H. L., of S. C. (2 cases); M. & J. H. B & Co., of N. H.; E. F., of Conn.; H. & S., of N. Y.; J. W. B., of Md.; J. B., of Ill.; D. J. O., of Pa.; W. B. G., of N. Y.; J. H. W., of Mass.; W. S., of Pa.; A. C. F., of Conn.; J. C., of N. J.; N. M., of N. Y.; J. A. A., of Conn.; J. T. B., of N. Y.; McG. & B., of La.; R. H., of Vt.; J. C. B., of N. Y.; T. E., of Pa.; W. H. F., of N. Y.; S. H., of Mass.; W. H. B., of Mass.

Important Items.

Models—We shall esteem it a great favor if invento s will always attach their names to such models as they send us. It will save us much trouble, and prevent the liability of their being mislaid.

Patent Claims—Persons desiring the claim of any in vention which has been patented within fourteen years can obtain a copy by addressing a letter to this office stating the name of the patentee, and enclosing $1 as fees for copying.

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LYON'S COPPER LIGHTNING CONDUCTOR—Patented July 11, 1854. The subscribers have purchased the entire interest of the patentee in the manufacture of these celebrated conductors, and are prepared to furnish them with the appropriate fixtures to all parties holding the right to territory, in any quantity and on short notice. Circulars sent on application. Address, BRITTAN & EDMONDS, Lockport, N. Y. 27 4 oam

TO MANUFACTURERS AND MECHANICS—Light rooms and steady power in any quantity, from one half horse to 50 horse, in a central position and at low rates. Facilities for exhibiting or testing new inventions, By Mr. GANDU, 102 Walker st. 27 4*

IMPORTANT TO AGRICULTURISTS, FARMers, Speculators, &c.—Scott's Patent "Little Giant Corn and Cob Mill." The subscribers having secured the right from Lyman Scott (the patentee of the celebrated Little Giant Corn and Cob Mill) for the States of Maryland, District of Columbia, Virginia, North Carolina, Mississippi, northern Louisiana, Tennessee, and Florida, are now prepared to offer great inducements to parties residing in any of the above named States, who wish to purchase town or county rights, for the sale of said mill. We will dispose of the entire right for the State of Florida upon reasonable terms. All communications promptly attended to. Address ROBBINS & BIBB, 27 2* Baltimore, Md.

A GREAT POCKET GUIDE—For the Mechanic and Engineer.—Now ready for subscribers. The "Mechanic's, Machinist's, and Engineer's Practical Book of Reference," containing Tables and Formulæ for use in superficial and Solid Mensuration; Strength and Weight of Materials. Mechanics, Machinery, Hydraulics, Hydrodynamics, Marine Engines, Chemistry, and Miscellaneous Recipes; adapted to and for the use of all classes of Practical Mechanics, together with the "Engineer's Field Book" containing formulæ for the various methods of Running and Changing Lines, Locating Side Tracks and Switches. &c. Table of Radii and their Logarithms, Natural and Logarithmic Versed Sines and external Secants, Natural Sines and Tangents to every Degree and Minute of the Quadrant, and Logarithms of Natural numbers from 1 to 10,000. By Charles Haslett, Civil Engineer, edited by Charles W. Hackley, Professor of Mathematics in Columbia College, N. Y. In one 12mo, vol. containing 176 engraved diagrams, and 520 pages. Bound in morocco, gilt, pocketbook form, with tucks. Price $2.50. As a book of reference, the Engineer, the Architect, the Shipbuilder, the Mason. the Carpenter, the Jointer, the Agriculturist, the Manufacturer, and Artisan in iron and every species of material, will find rules and recipes for all kinds of estimates, computations, constructions, mixtures, etc., which will excite surprise at their number, novelty, and value to every one. The work is eminently a practical Pocket Guide to all classes of Mechanics and Engineers. As a book for practical use in field work, it is more direct in the application of rules and facility of calculation than any work now in use. The tables and examples have been prepared with great care, and their accuracy may be relied upon. For further information those interested will learn its varied character and utility by consulting the contents furnished on application free of expense or postage.

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KNOWLES' PATENT PORTABLE Upright Saw Mills, for sawing logs 12 feet long, with portable Steam Engine and Boiler of sufficient power to saw from 8 to 15 M feet in one day. Everything complete; so that the whole can be put in operation in one day, for the sum of $1800, cash on delivery in New York City; and a Woodworth Planing, Tonguing and Grooving Machine, of 14 inches wide, constructed all of metal. Everything complete, so that it can be put in operation in two days, for the additional sum of $800; all warranted to give the purchaser entire satisfaction. The Saw Mill and Planing Machine can be operated at one time; the machine will plane from one half to two and-a-half in. thick, and from two and a half to fourteen inches wide. Address J. H. LESTER, manufacturer, 57 Pearl street, Brooklyn, N. Y. 27 2*

CHEAPEST PAPER IN THE WORLD—The Pittsburg, Pa., WEEKLY DISPATCH! One dollar a-year, or ten copies (to one address) for five dollars. The DAILY DISPATCH is a penny paper (circulation 8,000 copies.) Specimen copies mailed to order. Published in a great Manufacturing City. Inventors will find these papers are excellent advertising mediums. 26 2*

IRON FOUNDER'S FACING MATERIALS—Viz. Sea Coal, Hardwood Charcoal, Lehigh Coal, Soapstone, and German Black Lead finely pulverized; also Core Flour, Fire Clay, Fire Sand, and Fire Bricks, for sale by G. O. ROBERTSON, 135 Water st., New York. 26 2*

PATENT RIGHT FOR SALE—The undersigned, having received Letters Patent for the United States, France, and England, for Ventilating all kinds of Hats and Caps (specimens have been shown through the wholesale and retail trade, the Police Department, and a large number of private citizens, of New York, and met with universal approbation,) is desirous of selling the rights for France or England upon favorable terms. Apply to SELLERS & CO., No. 21 Elm street, New York, where all kinds of Patent Ventilating Dress and Straw Hats, Military, Police, and Civilian Caps can be had wholesale and Retail. 1*

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MOFFIT'S PATENT THRESHER AND SEPARATOR—Having obtained the right to manufacture and sell this celebrated machine for any part of the United States, America, or Europe, we are making a very large supply of different sizes, and can fill orders for any of them, at short notice. Our place of business is centrally located and accessible to all of the leading thoroughfares of the country. Our machines are warranted to be perfect in construction, workmanship, and material.—Descriptive pamphlets and circulars with certificates and references, sent to persons desiring information about them. OWENS, LANE & DYER,
26 2* Hamilton, Butler County, Ohio.

WHIPPLE'S PATENT NIPPER BLOCK—Holds fast all that is gained from pull to pull, gently lowers down any burthen, or keeps it safely suspended; works well by hand or horse. Is perfectly safe under all circumstances. Is simple and strong. Manufactured by Whipple & Co. GEO. GAY, General Agent for sale of rights, Hopedale, Milford, Mass. See engraving and description in Sci. Am. 25 3*

HOPPER'S IMPROVED BENCH PLANE—The patent right on this plane—a description of which is contained in the Scientific American, No. 25—is held and for sale by JOSEPH LUDEWIG, 31 Pine st., Room 10, New York City. 26 2*

DRAWING INSTRUMENTS—The largest stock in the country, comprising our well-known German silver Swiss instruments, and German, French, and others Surveying and engineering instruments, warranted of the best construction and quality. Catalogues gratis.
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26 6* C. D. PAGE, Patentee, Rochester, N. Y.

TO INVENTORS, ENGINEERS, AND Machinists—Models for Inventors, and wooden patterns for machinery and buildings of every description furnished at moderate terms, by G. HAGGENMULLER, 106 Center street, New York. 26 4*

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NORTH AMERICAN MACHINE AND COOPerage Co., at Elmira, Chemung Co., N. Y.—Manufacturers of Trapp's Patent Barrel Machines, being the only establishment in the world that manufactures machinery for all varieties of cooper ware, viz.: Tight Barrels, such as Pork, Beef, Whiskey, Beer, Fish, Oil, Spirits of Turpentine, Beef Tierces, Butter Firkins, White Lead Kegs, Flour, Salt, and Lime Barrels. Stave and Heading Saws constantly on hand. Also Rights under Trapp's patent for sale. M. H. FERRIS, Agent, Elmira, N. Y.
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J. BRYAN, Metal, Iron, and Copper Sash Maker, 219 Center st. near Grand, New York. Church, Cottage, and Greenhouse Sashes, Dom elights, Skylights, and Ventilators; Store Fronts, Doors, &c., &c. J. B. begs to call the attention of architects, church committees and builders to his metal sashes, which are so well adapted for churches, cottages, and public buildings, their great strength, lightness, and durability making them far more desirable than lead or wood lights. Contracts for supplying and glazing plain enamelled and colored glass under taken, also orders for wire matting, &c., for church or other windows, on moderate terms, and promptly executed in any part of the United States. 24 3* eow

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WANTED—A Foreman to take charge of a Door, Sash, and Blind Manufactory. Also a Foreman to take charge of a Planing Mill. None but those entirely competent, and the best of references, need apply. Address COTES & DAVIES, Davenport, Iowa. 25 4*

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12 6m* WELCH & GRIFFITHS.

ROCK DRILL—The American Rock Drill Co. invite attention to their superior machines, adapted for all kinds of rock work in quarries and mines and especially for artesian wells. They are simple in construction, powerful and accurate in operation, and can be run by hand, steam, or horse power. An engraving and full description appeared in No. 15 of the Scientific American. Apply to T. H. LEAVITT, Agent and Treasurer of the A. R. D. Co., No. 1 Phœnix Building, Boston, 17 3m*

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WOODWORTH'S PATENT Planing, Tonguing, Grooving Machines—Double machines plane both sides, tongue, and groove at one and the same time, saving one half of the time when lumber is required to be planed on both sides. Large assortment constantly on hand. Also steam engines and boilers of the best quality. Warranted to give entire satisfaction to purchasers.
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Science and Art.

Measuring Falling Water.—No. 1.

In the article on page 208—on the power of falling water—it was stated, that the power which propels machinery is estimated by multiplying the weight into the velocity of the moving body, such as the weight of the water into its speed. Examples showing how the amount of power was calculated, were also presented. The object of this article is to point out the means of estimating the amount of water which will pass through a certain opening of sluice, or through a certain open space in a given amount of time.

The quantity of water which flows in a stream in a given time, is generally ascertained by the open area of a sluice, or else by a rectangular notch cut in a board, in the edge of the dam, at the surface of the water; so that the section of the passing stream may be measured as it flows through the notch. If water flows through an opening regulated by a sluice in the flume of a dam, and the discharge is constant—the dam maintaining a uniform level above the opening—how can the quantity of water which flows through the opening of the sluice be ascertained? If the laws of gravitation (without correction,) governed the flow, it would only be necessary to measure the area of the opening and calculate the velocity as that of a body falling from the surface of a dam through the centre of the orifice, and the area multiplied by that velocity would give the quantity of water passing through it in a certain time. In the same manner, if no correction were required to find the quantity flowing through a rectangular notch in the plank or weir on the edge of the dam, it would only be requisite to measure the hight from the surface of the dam to the bottom of the notch, in order to find the velocity of the water, as by the law of falling bodies, and then take two-thirds of the quantity which would flow at that velocity through the area of the notch, for the area of the parabola described by the notch—it being two-thirds of its circumscribed rectangle. Such were the rules given at one time by the best authorities, but experiments proved that the actual quantity of effluent water was less than the theoretic quantity. George Rennie, the celebrated civil engineer, made a great number of experiments on flowing water, and his reports were published in the transactions of the Royal Society. The French government at one time appointed a commission of engineers, who made elaborate experiments on a large scale, on falling water, and various experiments were made by other persons—the latest, most elaborate, and accurate, being those made under the direction of Mr. Francis, at Lowell. The conclusions arrived at by Rennie, were: 1st, That the quantities discharged in equal times are as the areas of the orifices. 2nd, That the quantities discharged in equal times under different hights, are as the square roots of the corresponding hights. 3rd, That the quantities discharged in equal times under different hights, are to each other in the compound ratio of the areas of the apertures and of the square roots of the hights, *nearly*—the hights being measured from the center of the apertures. The coefficient or number expressing the proportion between the theoretic discharge of the water calculated as a falling body, and the actual discharge as measured, was ·600, (or ·6) for rectangular openings, or four-tenths less than the theoretic discharge. The following is Rennie's formula:—

Letter A=the area of the orifice, in square feet.

H=the head or hight of water, in feet.

T=the time in seconds.

g=the action of gravity, in one second.

Q=the quantity of water discharged, in cubic feet.

Suppose the orifice to be 2 feet long and 6 inches deep, (one square foot,) having the long side parallel with the water's surface, and head 4 feet above the center of the opening. Then will Q=·6 A T V *g* H. Then multiply 64 —the effect of gravity, by 4 feet, the hight of the head—and extract the square root for the theoretic velocity in feet per second, and as the area of opening is one square foot, the quotient will be the quantity discharged in cubic feet per second. Multiply this by the co-efficient ·6, or deduct four-tenths, and we have the actual discharge. Thus, 64·3×4=257·2—the square root of which is 16·037, the theoretic discharge:—16·037×.6=9·6222 cubic feet actual discharge per second—577·33 cubic feet per minute. If this amount be multiplied by 62·5 and 4 then divided by 33,000, the horse-power of it will be ascertained.

The result here obtained is the same as that by the old rule, viz.: "multiply the square root of the hight of the head by 8·02, for the velocity." The ·6 is the co-efficient of correction. An explanation of the data for such calculations will be useful to many persons.

The velocities of falling bodies are as the times of descent, and the spaces fallen through are as the squares of the times; consequently the velocities are as the square roots of the hights—therefore, as gravitation produces the velocity of 2 in descending through the space of 1, the hight in feet through which a body falls being multiplied by 64·3 will give the square of its velocity in feet per second. So if the height fallen be 1 foot, the square root of 64·3—8·02 (nearly) is the velocity with which a heavy body falls through the space of one foot. In the above example the square root of the hight 4 feet, 2×8·02=16·04. The same method of calculation will answer for any hight and any area of opening, to ascertain the amount of effluent water passing through a rectangular orifice in a given time.

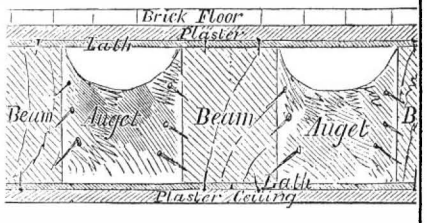
[For the Scientific American.]

French Method of Building Houses.

In relation to an article in a late number of the Sci. Am., on fires, allow me to give you a few details about the construction of floors in the houses of Paris, which you mention. In this city [New York] all the floors are formed simply by nailing boards on the upper face of the joists, and laths on the under part, to hold the ceiling. No provision is made to prevent fire from destroying such floors. When a fire makes an opening through the ceiling, the joists and boards of the floor above are soon burned, and the opening which is thus made, causes an increase of the flames, by forming a draft. And as the same effect is produced on each floor, the whole building soon becomes an immense furnace.

I think, then, that in the construction of the floors alone, consists the whole secret of incombustible houses; the conflagration being limited between two floors, gives time to bring an efficient remedy before it can communicate to the whole building.

The floors of French houses are constructed as shown in the annexed diagram.



When the joists are fixed in their place, some spikes are driven on each face, at a distance of about two inches from each other, and in a slanting position, at the same time the under part, which forms the ceiling is covered with laths. The masons then form between the joists what is called *les augets* (because it has the shape of an *auge*, or trough.) The spikes and fibers of the timber give a good hold to the plaster, which is also supported by the laths of the ceiling on which it is pressed and worked down to the said shape, leaving only about three or four inches thickness in the middle, and rising against the sides nearly to the top of the joists.

On the upper face of the joists there is another layer of laths, and on these a coat of old plaster from demolitions, laid on with mortar or plaster, and on this are laid the baked hexagonal bricks, which are very generally used. When wooden floors are required, some strips of oak are spiked on the coat of plaster above mentioned, so as to take hold in the joists, and on these strips the *parquet* is nailed.

The timbers of the floors are thus confined between two coats of plaster, and each joist is itself coated with it on its four faces. It is thus that the houses of Paris are secured against fires. No conflagrations like those in New York ever take place in Paris, and when a fire does break out in an apartment, the firemen have only to provide ladders for the windows, through which they can generally soon master the fire—the flames most generally coming out through the windows, having no escape through the floors.

As the French people turn everything into songs, even the most serious calamities, there is one told as being sung by a fireman making a comparison of his *belle* to a house on fire, and he speaks of her sparkling eyes as an expression of her passionate feelings. E. B.

Increasing the Speed of Steamboats.

At a meeting of the Royal Scottish Society of Arts, held in Edinburgh on the 14th of January, a paper was read on the subject embraced in the above caption, by Robert Aytoun, which caused some discussion, of which the following is the substance, taken from the London *Artizan*:—

Mr. Aytoun stated that the proposition in hydraulics, that the power required to impel a boat increases as the square of the velocity, has exercised a pernicious influence over the minds of shipbuilders, in making them look upon it as hopeless to attempt any great increase of speed, which was to be attended by such enormous increase of power. This proposition, by showing the impossibility of greatly increasing speed with any of the known forms of boats, by giving them increased power, clearly indicated that the path of improvement, if any, must lie in new forms, calculated to take advantage of the new power of the marine steam engine. It at once occurred to him that, by elongating the bow of the vessel, that water which our present steamboats dash aside from their path with great force and velocity, and the rapid removal of which absorbs the whole power of the engine, might be laid aside comparatively slowly and gently, like the sod from a plow, however great the speed of the vessel. A diagram was shown, exhibiting three steamboats, whose midship sections were all equal, but the length of whose bows were, respectively, 1, 2, 3. It was pointed out that when No. 2 had twice the speed of No. 1, it dashed aside the water in its path with no greater velocity than did No. 1, and therefore did not require more steam power, though proceeding at double speed. That when No. 3 had thrice the speed of No. 1, it dashed aside the water in its path with no greater velocity than No. 1, and therefore did not require more steam-power, though proceeding at three times the speed. It thus appeared that the well-known proposition above referred to, which has so long paralyzed the efforts of shipbuilders, must now give place to the more hopeful one—namely, that the resistance to the motion of boats may be made the same for all velocities, by suiting the form of the boat to the velocity required of it. A similar proposition, in regard to railways, was early made by Mr. Maclaren, with the happiest results, at a time when eight or ten miles an hour was the greatest speed they were thought capable of achieving. The author stated that it was to be hoped that enterprising shipbuilders would not be slow in realizing the same speed in steamboats which the railway engineers have done in the rail, and that, by the elaboration of the self-same proposition—namely, that the resistance to motion may be made the same for all velocities. A considerable advance in speed has been attained of late years by fining the lines of steamboats, by cutting them in two, and inserting an addition to their length amidships, or by increasing their original length, though this last is often marred by a proportionately increased breadth of beam. That these were all steps in the right direction, and tend to support the principle just stated; but nothing short of an attempt to reach thirty or forty miles an hour will satisfy the occasion. Mr. Sang, Mr. Elliot, and Mr. Swan, discussed the subject of the paper at some length; and while they admitted, as mathematicians, the correctness of the principle advanced by Mr. Aytoun, considered that that gentleman had not given sufficient weight to other sources of resistance to the motion of boats, such as friction, which would become very formidable when boats of the great length which he advocated, were urged to great speed.

The Pitch Lake of Trinidad.

The Earl of Dundonald has purchased estates surrounding the above-named lake, and he has obtained a grant of about one-third the surface of it. A company has recently been formed in London, for the purpose of manufacturing a "patent fuel" of this pitch, mixed with other substances, to be used as a substitute for coal, by the West Indian steamers.

Wheat, Flour, Bakers and Millers.

The signature printed to the article on the above-named subject in the last No. of the Scientific American, was T. Royal, Bridgeton, Pa. It should have been J. Royal, Bridgeton, N. J.

Literary Notices.

Haslett's Engineer's Book of Reference.—It might be supposed that the engineering world was satiated with books for reference in the every-day life of engineers; but this is not the case, judging from the number of pocket books on engineering which have issued from the press during the past few years. We must say that each of the books of this character recently published has peculiar qualities of its own entitling it to patronage, and this is peculiarly the case with the above-named work, just published by Stringer & Townsend, this city, and edited by C. W. Hackley, Prof. of Mathematics in Columbia College. This book contains over 500 pages of closely printed matter, embracing "Haslett's Field Book" for engineers, and much general information very valuable to machinists and carpenters as well as civil engineers. Its general information is more varied and extensive than any other work of the kind with which we are acquainted. The author, Mr. Haslett, is a civil engineer of much experience, and this is not his first literary appearance before the public. The editor, Prof. Hackley, is one of the most distinguished mathematicians in our country, and unitedly they have made a most valuable and reliable book.

Knickerbocker Magazine—The March number is out and for sale at the publishing office, and at all the periodical stores. Price 25 cents per copy, $3 per annum. S. Huestis, publisher, 348 Broadway.

Putnam's Magazine for March, is an excellent number. Dix & Edwards, publishers, 321 Broadway.

Frank Leslie's Journal, for March, is received. It is full of interesting reading,

Westminster Review—The number for this quarter of this Review, commences a new volume. It contains seven long and able essays, besides the usual able criticisms on contemporary literature. The first article is on "German Wit," and is a literary treat. There is one on "The House of Savoy," which is well worthy of universal perusal. This Review is called "Liberal in sentiments," and is conducted by Chapman, the American publisher in London. It is re-published by L. Sco and Co., No. 54 Gold st., this city. This is an excellent time to subscribe.

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